

SONY®

WM-10 WM-20

STEREO CASSETTE PLAYER

US, Canadian Model

AEP, UK, E Model

Sony Corporation

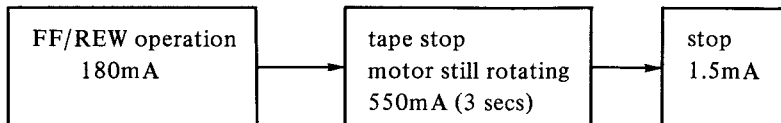
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This book is for quick and easy repairing.
File with the service manual.

(1) General Precautions for Repair

- 1) There is a safety switch built into the headphone jack, but it does not operate unless the headphone plug is plugged in.
- 2) When screwing in the control panel and audio board screws, be sure to insert a cassette tape first.
Reason: If pressure is applied to the tape transport reel chassis, its plane is affected.
- 3) When performing repair which involves the removal of the function plate block or sleeve ass'y, be sure to check shut-off for FWD.
- 4) In FF/REW mode, there is a rolling noise for about 3 seconds at tape end, then the motor stops. Check by referring to the power changes below.

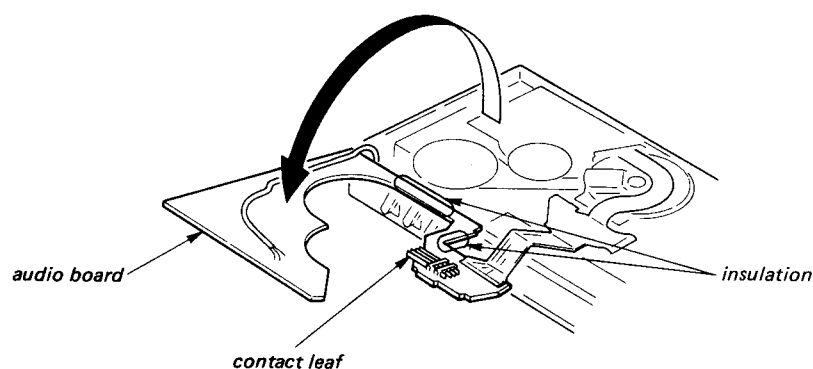


- 5) Do not reuse the capstan bush after having removed it.
- 6) By removing the audio board from the set and touching S303-1 (Power ON) the motor will rotate without pushing the FWD button (belt is on).
There will be a clicking noise, but this is not a defect, and will stop when the FWD button is pushed.
- 7) Defective soldering, pattern cuts, parts touching, etc. are not included under "Defective Parts" and "Defective Locations", but be sure to check these also.

- No Operation
- Noise when battery is worn out (less than 0.9V)

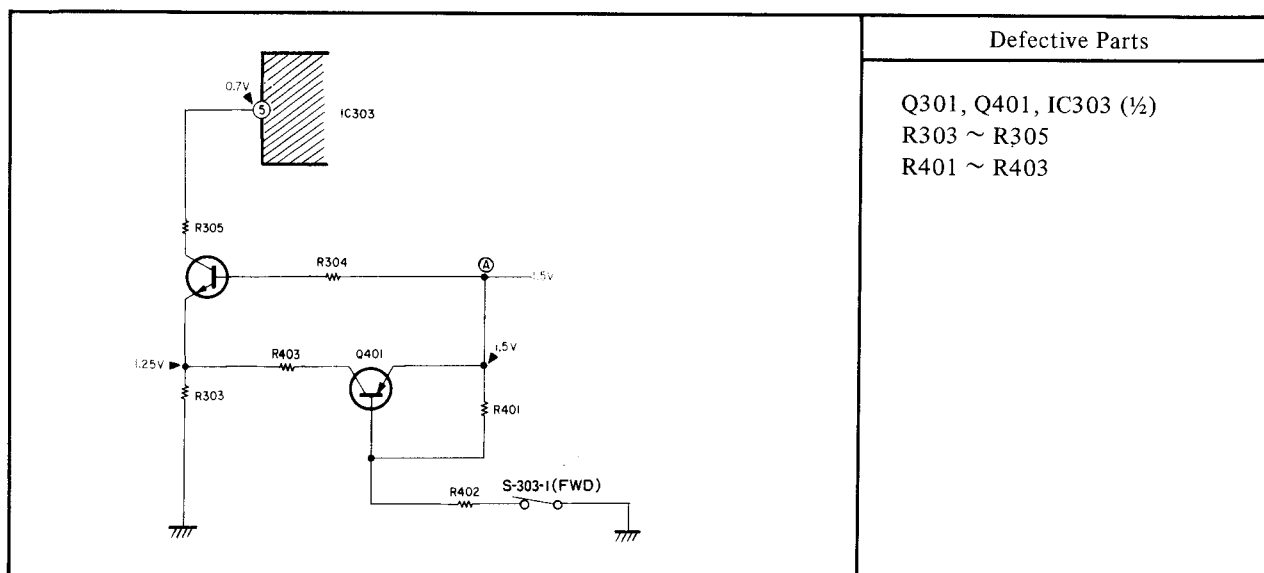
- No Operation

Cause	Defective Location
Battery worn out Battery terminal plate dirty.	Clean terminal plate (Daifron solvent)
Dirty leaf switch contact point.	S303-1 contact point cleaning (Daifron solvent)
Battery short: battery + terminal and audio board ground touched.	Stick insulation on audio board.
Short of function plate ass'y mounting screw tip and audio board pattern.	Stick insulation on audio board.



- Noise when battery is worn out

Operation: When ① becomes 1.0V, Q401 goes off, Q301 turns on, grounds IC303 ⑤ and reduces buzz noise.

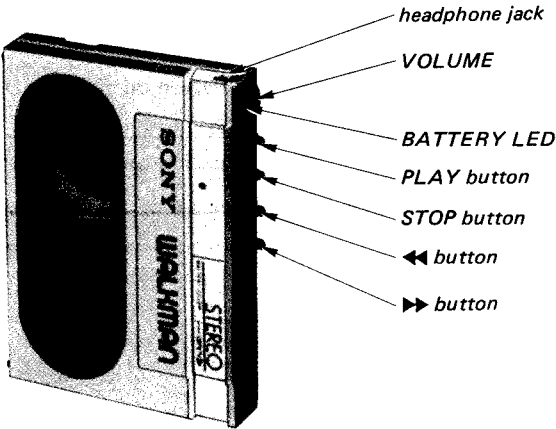


WM-10/WM-20

- No Power
- LED does not light up
- No converter operation
- Converter Board Simple Check Method

• No Power

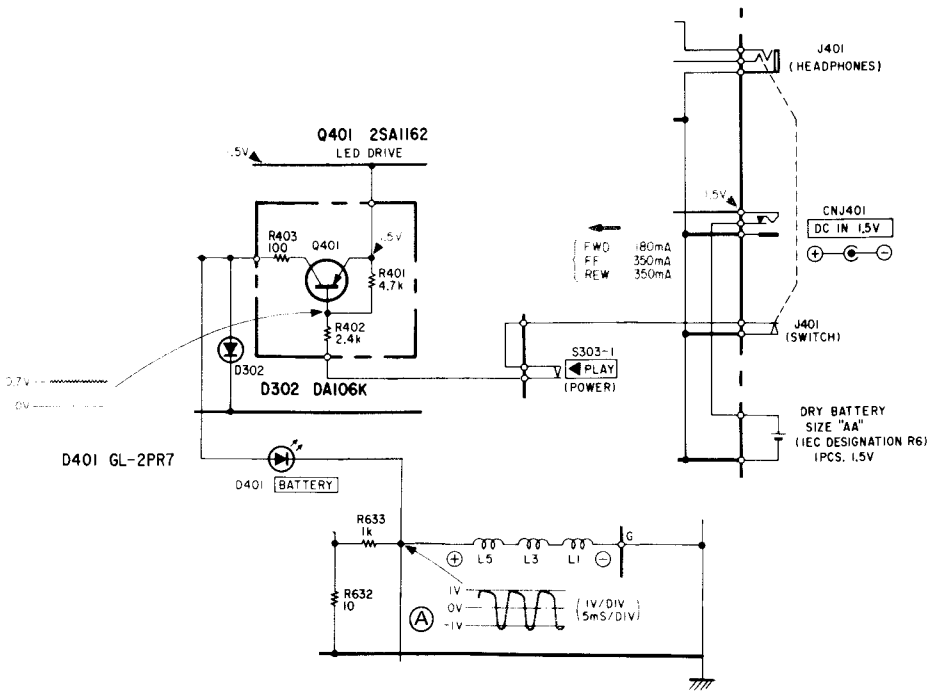
If the battery LED lights up and reel table rotates when the headphone plug is plugged into the headphone jack and PLAY button is pressed, OK.



No operation when headphone plug is plugged into head-phone jack and PLAY button is pressed.	Defective Part
	J401, S303-1

• LED does not light up

Voltage, Waveform	Defective Parts	Notes
reverse voltage	D401, R401 ~ R403 Q401, L1, L3, L5 flexible board D302 short open	This LED (D401) uses motor reverse voltage, so does not light up if the motor does not rotate. Lights up at 2.5V



- No converter operation

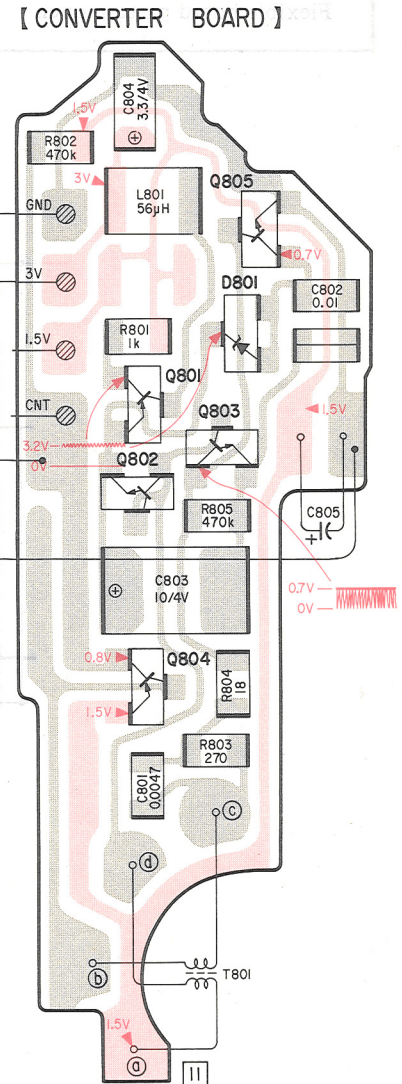
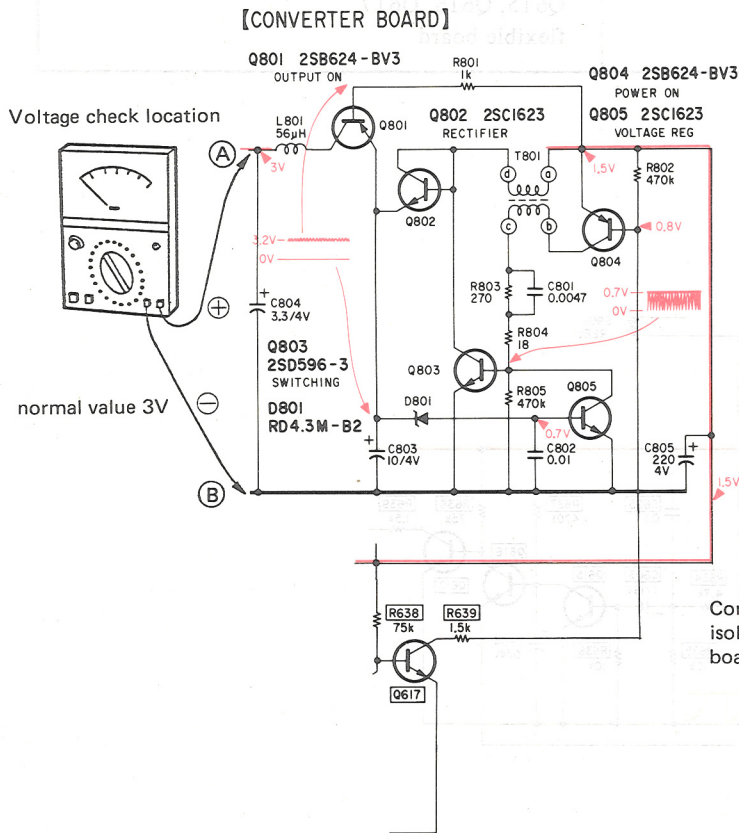
Operation:

1.5V is first made AC, raised to 3.0V, then DC 3.0V is obtained. Frequency approx. 100kHz.

- Converter Board Simple Check Method

When the converter board is on the servo board (A), check for 3V between (A) and (B).

When the converter board is by itself, solder on a 1.5k Ω resistor as shown in the figure below and check for 3V between (A) and (B).



- Transistor Section

Tr name	* open	short between E-C	short between E-B
Q801	0V	3.0V	0V
Q802	0V	0.4V	—
Q803	0V	0V	0.4V
Q804	0V	0V	0V
Q805	7V	0.5V	4.2V
Q617	0V	3.0V	0V
D801	7V	0V	—

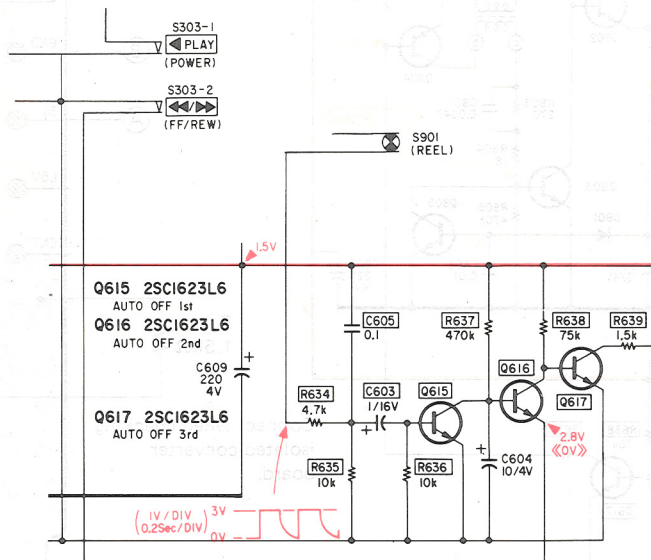
* measured when each Tr is removed.

- Resistor, Transformer Section

R, T name	open
R801, R803, R804, R638, R639, T801	0V

(• Motor does not stop for FF/REW STOP)

Cause	Defective Parts
Defective rotation switch (S901) contact point. Auto off circuit structural parts Flexible board pattern open	S901, R634 ~ R639, C603 ~ C605 Q615, Q616, Q617 flexible board



T _r name	open	short	short
Q801	0V	3.0V	between H-B
Q802	0V	0.4V	between E-C
Q803	0V	0V	0.4V
Q804	0V	0V	0V
Q805	7V	0.5V	4.2V
Q617	0V	3.0V	0V
D801	7V	0V	—

* measured when each T_r is removed.

R, T name	open
R801, R803, R804, R858, R859, T801	0V

- No Muting
- No Sound (FWD, but no sound)
- Low level
- No Dolby
- Hum Noise during Playback
- Noise on L-CH

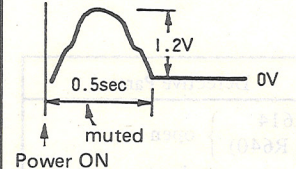
- No Muting

Operation:

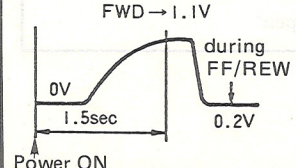
Mutes click noise immediately after power on at power IC (IC303) pin ⑩.

During FF/REW, IC303 pin ① becomes 0.2V and muting is applied.

IC303 pin ⑩

Voltage, Waveform	Defective Parts
	Q302, R307, R308 C306, IC303

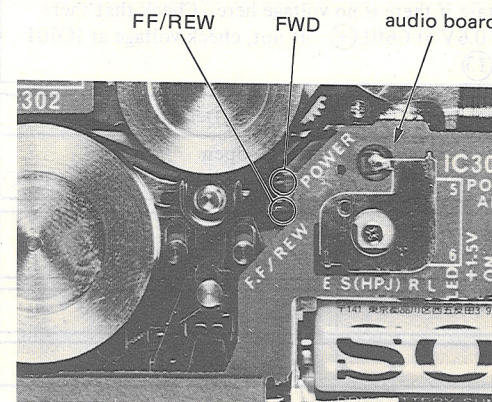
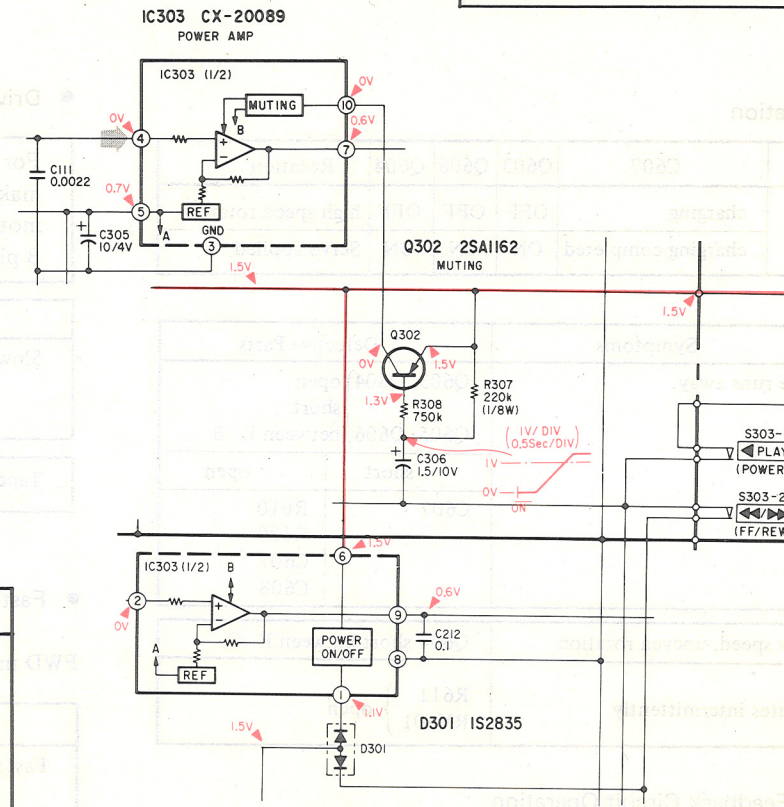
IC303 pin ①

Voltage, Waveform	Defective Parts
	D301, IC303

Note: Use an oscilloscope to measure IC303 pin ① voltage.

- No Sound (FWD, but no sound)

Cause	Remedy
Head lead open, defective head contact.	Check head lead, head position.
If leaf switch S303-2 (FF/REW) is on, muting is applied.	Move audio board in direction of the arrow to change FF/REW switch contact point.
Defective preamp IC (IC301), Dolby IC (IC302), power IC (IC303), circuit structural parts, or audio volume defective.	Check IC301, IC302, IC303, Circuit parts, audio volume
Defective contact point because of ground plate solder on rear of audio board.	Check ground plate solder. (8 locations)
No playback level.	*See next page "Level".



* Conditions

DOLBY: OFF
TYPE: NORMAL
standard tape: P-4-L81
Headphone connected

HEAD IN IC301 L⑧ } 1mVp-p
IC301 R① }
PRE AMP IC301 L⑩ } 60mVp-p
IC301 R⑮ }
DOLBY OUT IC302 L⑭ } 110mVp-p
IC302 R③ }
Adjust so that VR OUT is 60mVp-p.
POWER AMP IC303 L④ } 60mVp-p
INPUT IC303 R② }
HEADPHONE OUT 700mVp-p

- Low Level

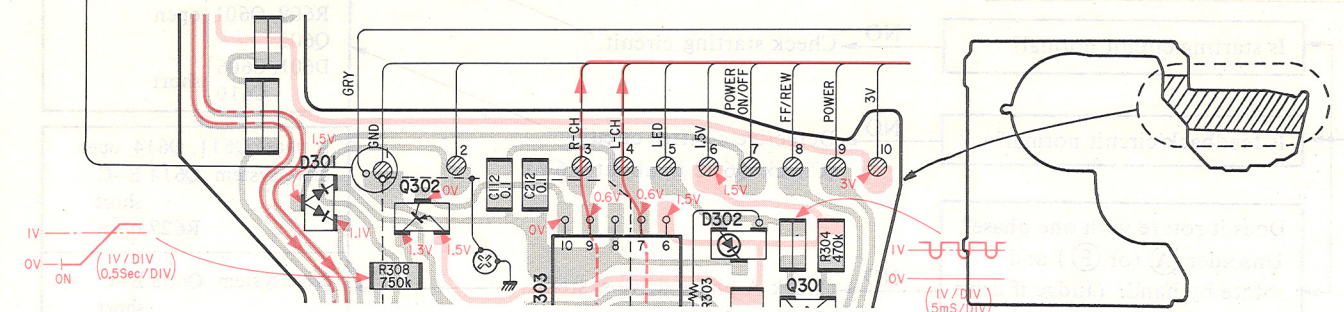
Cause	Defective Locations		
Dolby (PB) level off	Adjust variable resistors (RV101, 201) so that sound volume entrance is -27.7dBs ±1dB when standard tape is played back.		
	-27.7dBs	actual value	0.028V ~ 0.036V Measure by VTVM
	±1dB	P-P	79.2mVp-p ~ 102mVp-p Measure by oscilloscope

- No Dolby

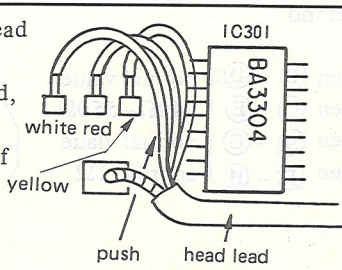
Cause	Defective Parts		
Dolby circuit Dolby adjustment also should be checked	IC302	L-CH	R111, R106 ~ R109, C104 ~ C109
	S302 R302	R-CH	R211, R206 ~ R209, C204 ~ C209

- Hum Noise during Playback

Cause	Remedy
Generated when battery voltage is down.	Replace batteries.
Defective soldering on flexible board next to Q302 (GND pattern) and GRY lead (for GND).	Repair soldering on flexible board and GRY lead.



- Noise on L-CH

Cause	Defective Location
Rotation switch (S901) noise goes onto head lead.	Change head lead positioning. Press white, red, yellow leads in the direction of the arrow. 

- No Motor Rotation
- Motor Coil Check Method
- Fast, Slow Speed
- No Speed Acceleration
- Servo Board (A) (B) Simple Check Method

- No Motor Rotation

1 Correct power supply voltage at servo circuit? (1.5V and 3V) NO → Check converter board.

YES

2 Is coil normal?
Measure (A) or (F) pin relative to ground by oscilloscope, turn motor by hand and observe the waveform.

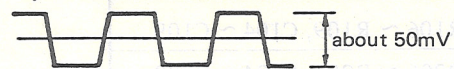
NO → Replace coil.



YES

3 Is Hall element normal?
Measure (C) or (E) relative to ground by oscilloscope, turn motor by hand and observe the waveform.

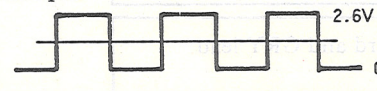
NO → Replace coil
(Hall element is inside coil).



YES

4 Switching timing
Rotate motor by hand, observe IC601 pin ① waveform on oscilloscope.

NO → Replace IC601.



YES

5 Is starting circuit normal? NO → Check starting circuit.

6 Is feedback circuit normal? NO → Defective control circuit.
(Check Q602 E, about 0.6V)

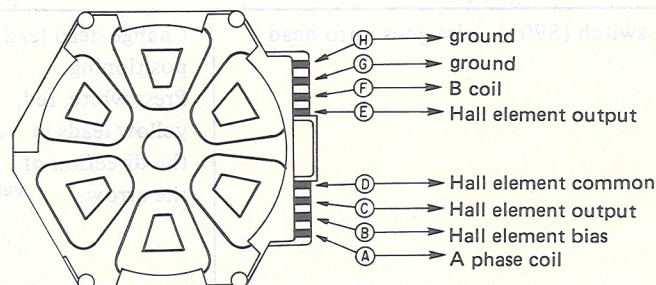
7 Does it rotate with one phase?
Unsolder (A) (or (F)) and rotate by hand. (Judge if drive system B phase is normal, or A phase is normal.) NO → Check A phase drive system.
(B phase drive system)

Defective Parts

C608 short
R606, R607 R609, Q601 } open
Q602 D601, C606 } short
C610
A phase Q611, Q614 open drive system Q614 E-C short
R627 open
drive system Q608 E-C short
C601 short
common R603, R621 open

- Motor Coil Check Method

- a. Hall element between (B) - (D) } normal value
between (C) - (E) } 240Ω-550Ω
- b. coil check between (A) - (G) } normal vlaue
between (F) - (H) } approx. 1Ω



- Starting Circuit Operation

Q605	C607	Q603	Q606	Q604	Rotation
Goes on by motor reverse voltage at the same time as motor rotation.	charging	OFF	OFF	OFF	high speed rotation
	charging completed	ON	ON	ON	Servo applied

Symptoms	Defective Parts
Tape runs away.	Q603, Q604 } open short Q605, Q606 } between E-B short C607 } open R610 R620 C607 C608

Slow speed, uneven rotation	Q604 short between E-C
Rotates intermittently	R611 } open RV601 }

- Feedback Circuit Operation

Motor cannot rotate if there is no voltage here. Check that there is approximately 0.6V at C601 (+). If not, check voltage at IC601 pins ⑩, ⑪, ⑬.

Symptoms	Defective Parts
Tape runs away	R605 open Q601, Q602 short between E-C
Tends to run slow	C606 open Q602 short between E-B
Slightly fast	D601 open
Rotation uneven	R628 open

- Drive Circuit Operation

For no rotation, unsolder A phase (or B phase) to make it open and rotate the motor by hand. If the motor rotates at high speed only for B phase only, B phase drive circuit is OK and A phase is defective.

Symptoms	Defective Parts
Slow speed	R602, R608, R624 open Q610, Q611, Q612 } short Q609, Q613 } between E-C

Tape runs away	R601, R604 open
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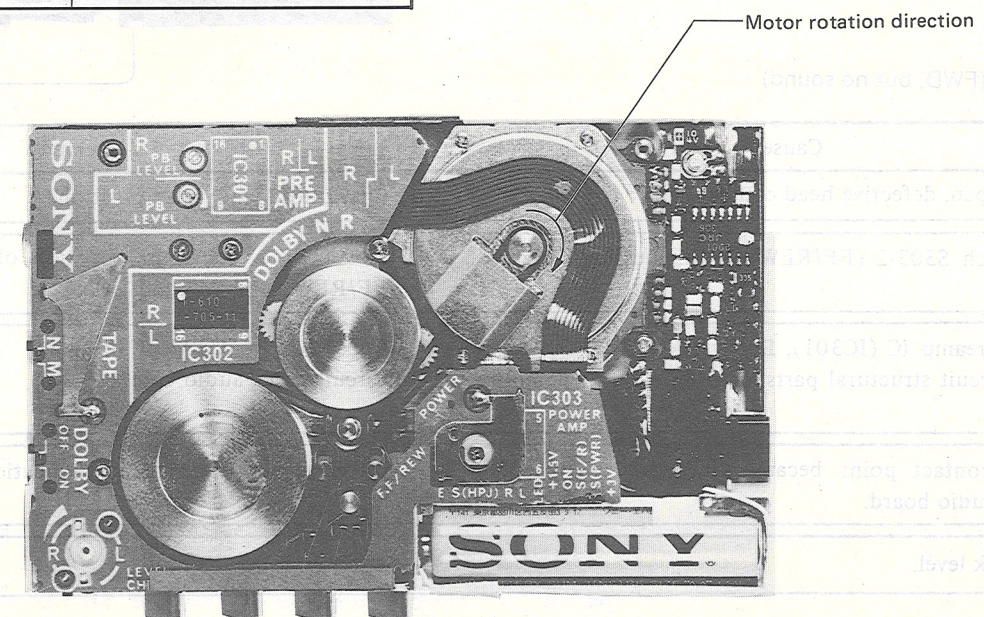
- Fast, Slow Speed

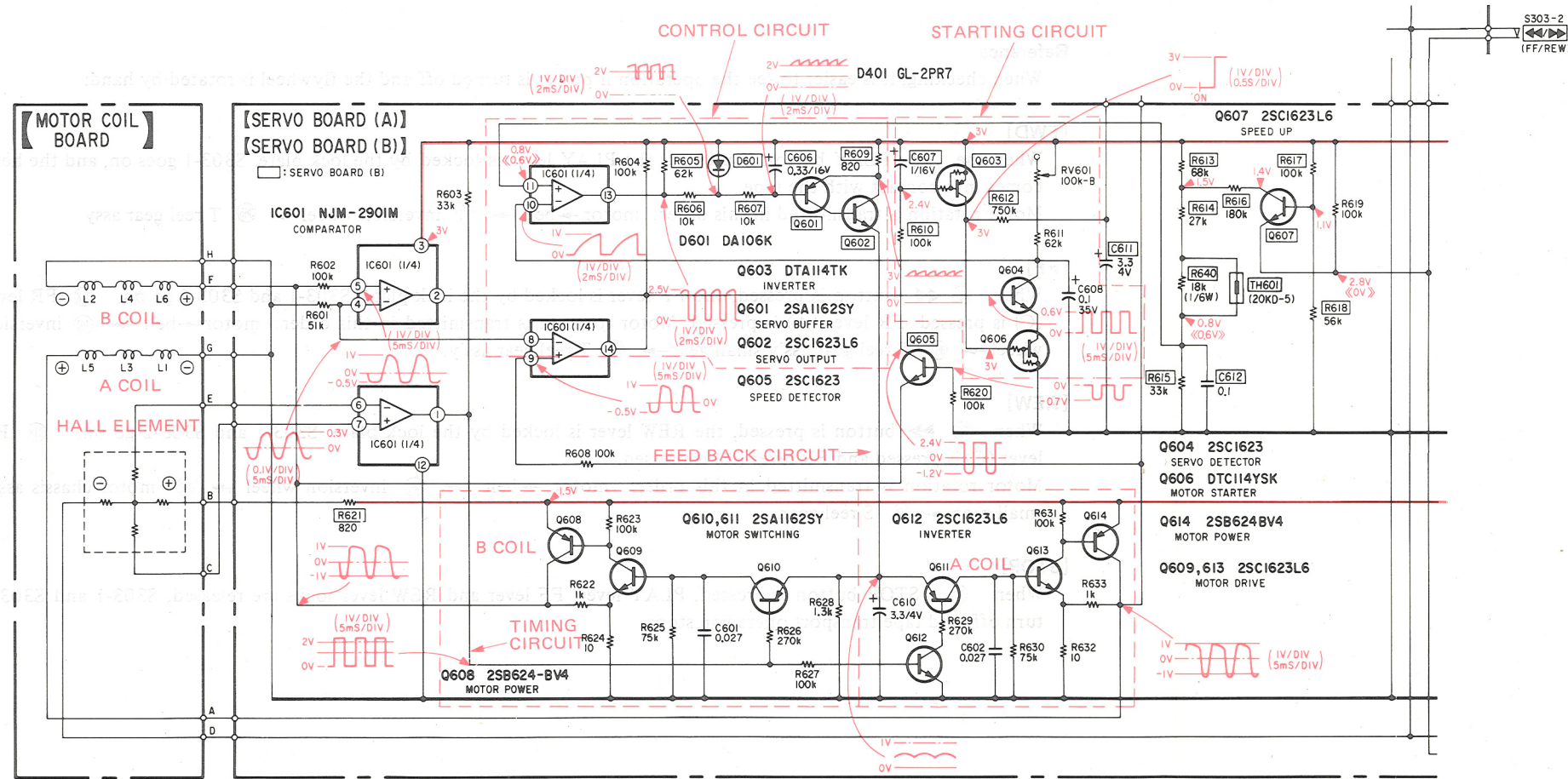
FWD mode

Symptoms	Defective Parts
Fast speed	R613, R614 } open (TH601, R640) } short C612

Slow speed	R618 open Q607 short between E-C RV601 hits control panel.
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Slow speed, uneven rotation	R615 open
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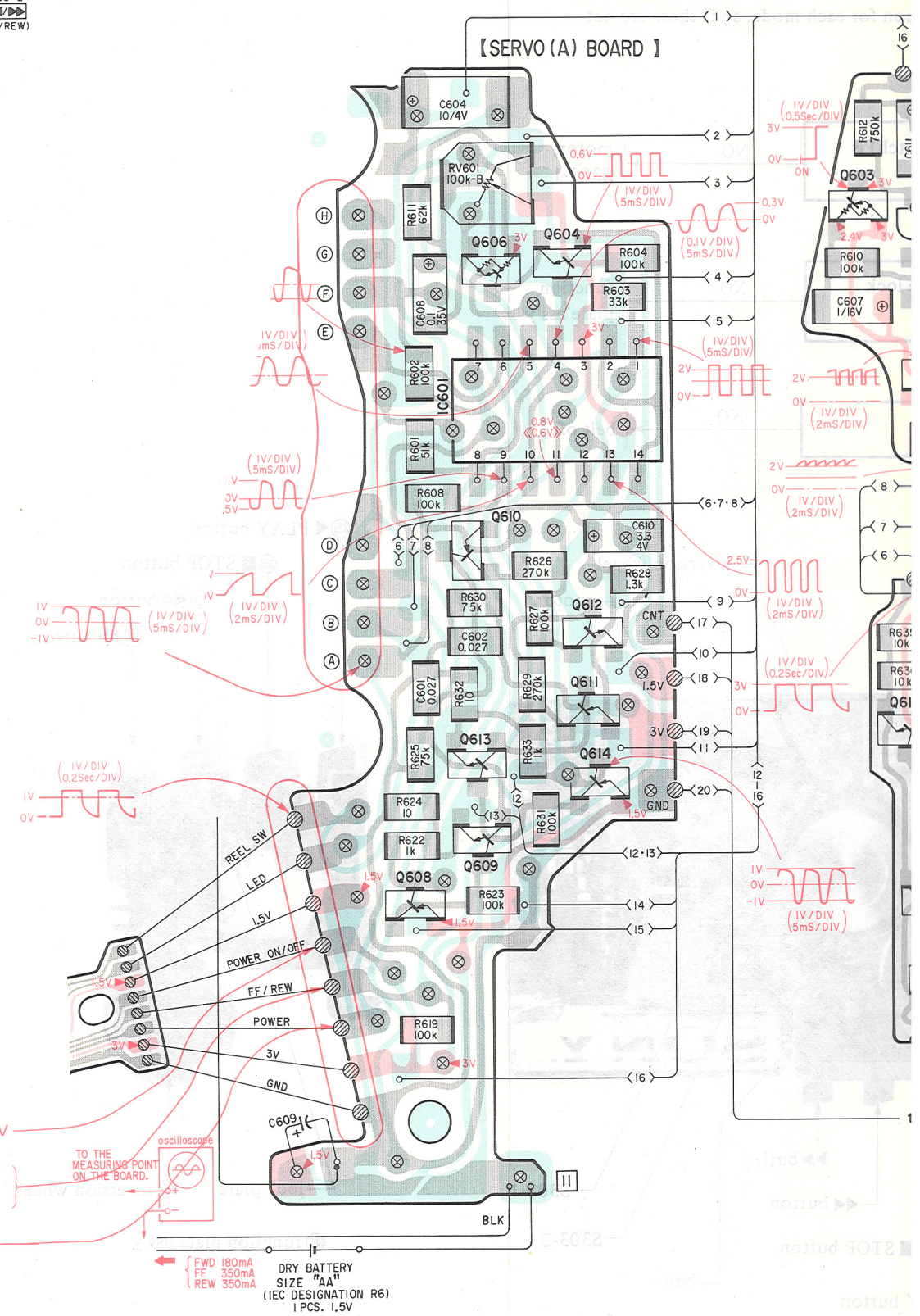


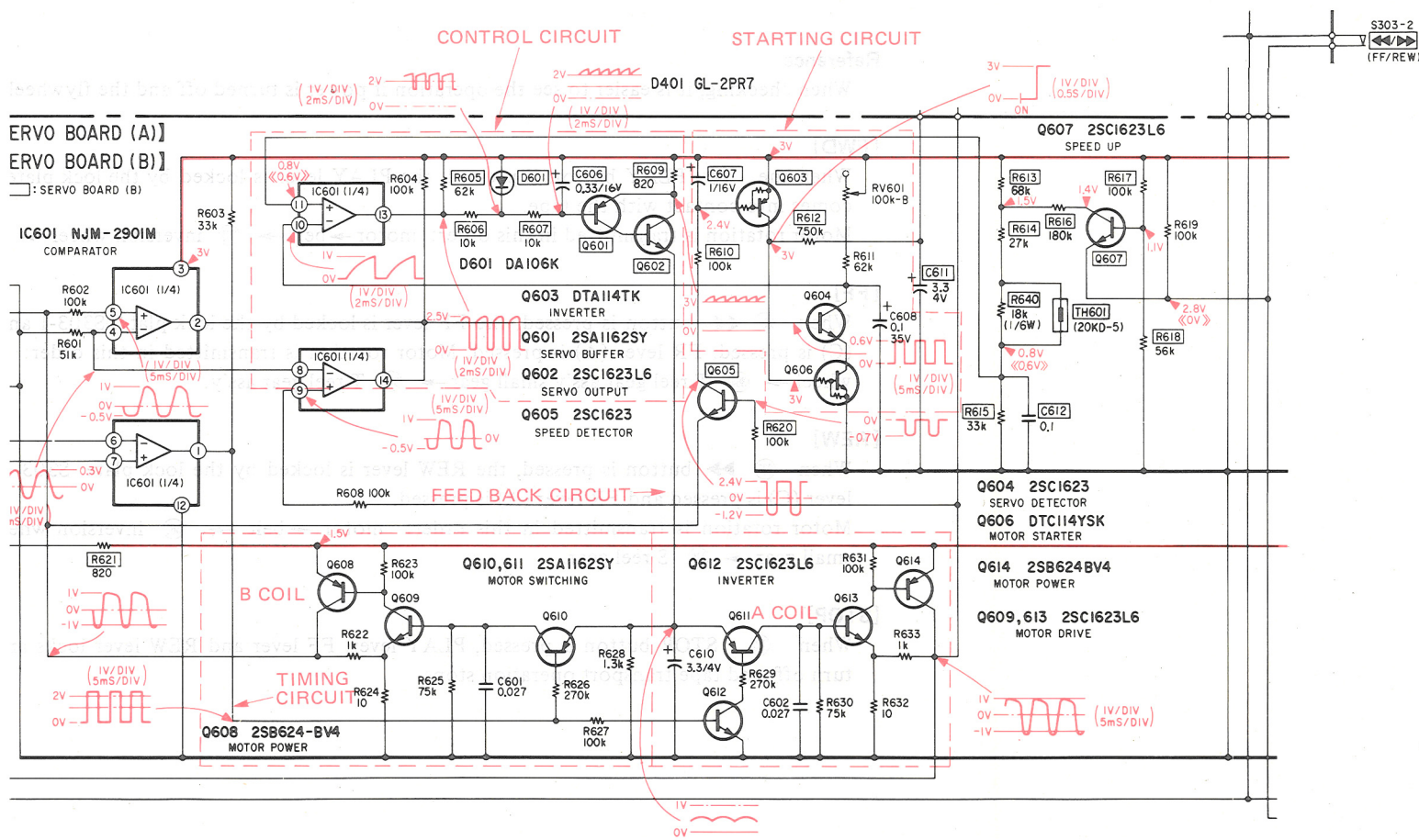


- No Speed Acceleration
- Acceleration Circuit Operation
Leaf switch S303-2 (FF/REW SW) on turns on Q607, lowering reference voltage which controls servo voltage (normally 0.8V — 0.6V), and accelerates to about 1.2 times normal speed.
- FF/REW Mode

Symptoms	Defective Parts
No speed acceleration	R616, R617 Q607 } open short between E-B S303-2

- **Servo Board (A) (B) Simple Check Method**
- Check servo board (A) motor side pins (8), A to F waveforms and the voltages of each of the 8 flexible board pins.
- The voltages and waveforms should be as shown in the figure.



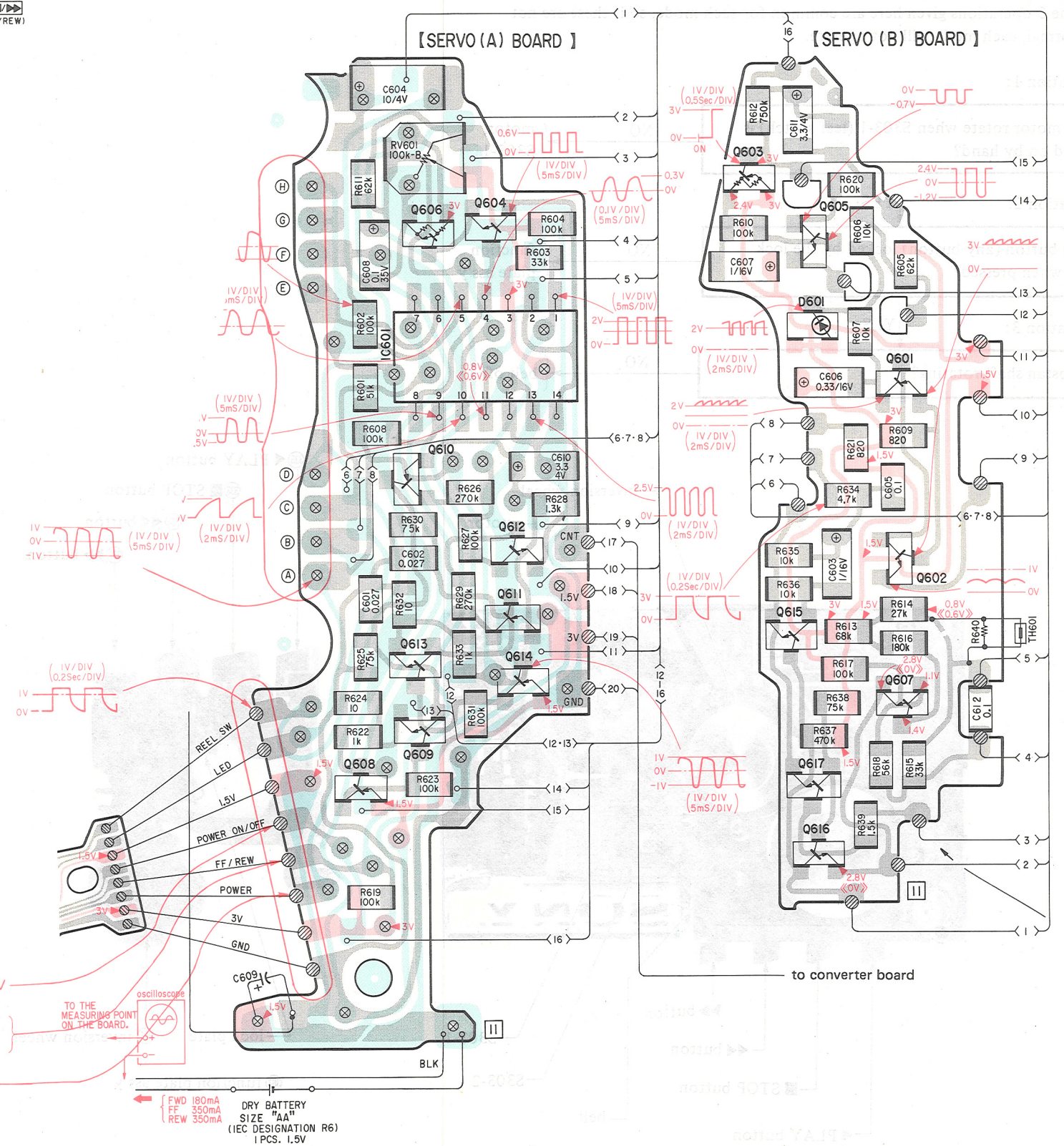


• Servo Board (A) (B) Simple Check Method

Check servo board (A) motor side pins (8), A to F waveforms and the voltages of each of the 8 flexible board pins. The voltages and waveforms should be as shown in the figure.

ration
/REW SW) on turns on Q607,
ge which controls servo voltage
V), and accelerates to about

Defective Parts	
R616, R617	open
Q607	short between E-B
S303-2	



POWER ON: 0.5V

FWD mode: 1.9V

FF/REW ON: 0V

POWER ON: 0V

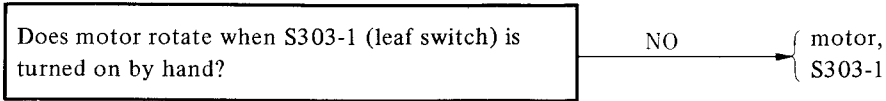
TO THE MEASURING POINT ON THE BOARD.

DRY BATTERY
SIZE "AA"
(IEC DESIGNATION R6)
1 PCS. 1.5V

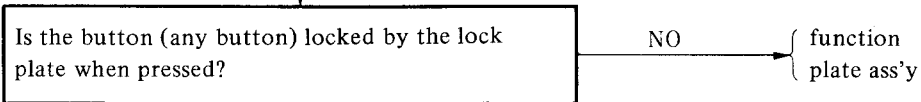
• Defective Tape Transport I

- Belt must be strung properly.
- The 3 operations given here are common for each mode, so if these are not normal, each mode will not operate.

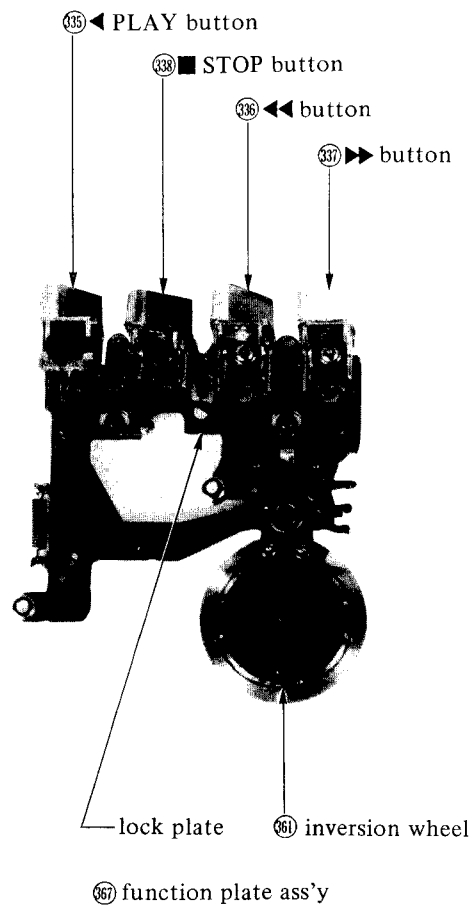
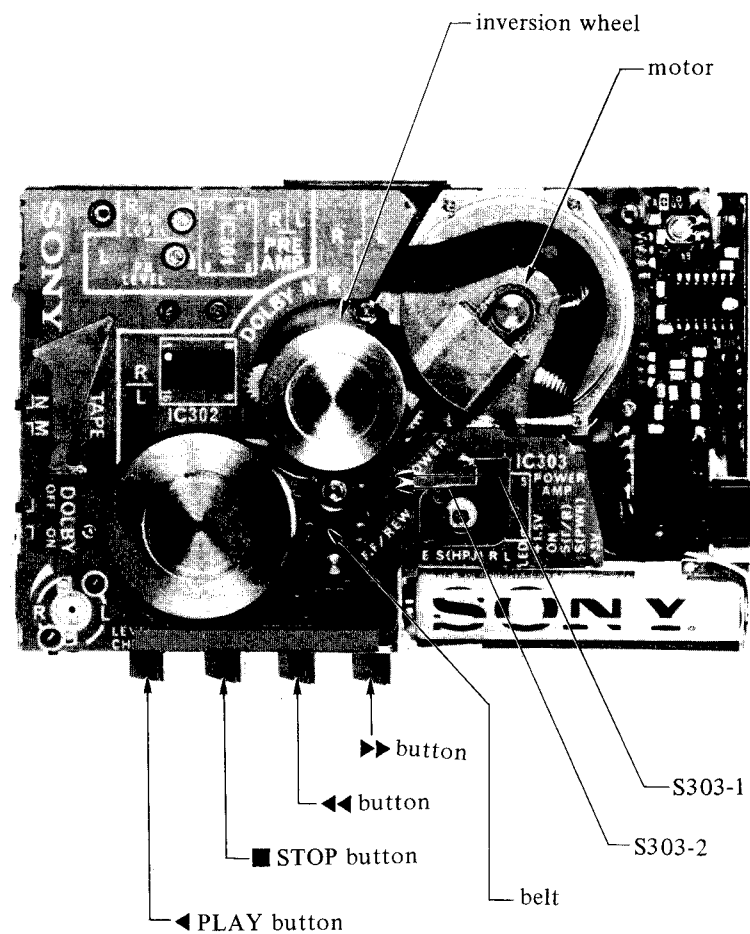
Operation 1:



Operation 2:



Operation 3:



Reference

When checking, it is easier to see the operation if power is turned off and the flywheel

[FWD]

When the 335 PLAY button is pressed, the PLAY lever is locked by the lock plate, S303-1 and comes into contact with the tape.

Motor rotation is transmitted in this order: motor → belt → 361 inversion wheel →

[FF]

When 336 button is pressed, the FF lever is locked by the lock plate, S303-1 and (C) is pressed, FR lever (A) is pressed. Motor rotation is transmitted in this order: wheel → 364 T reel gear ass'y small gear → 365 T reel gear ass'y.

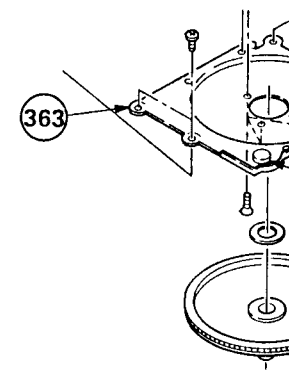
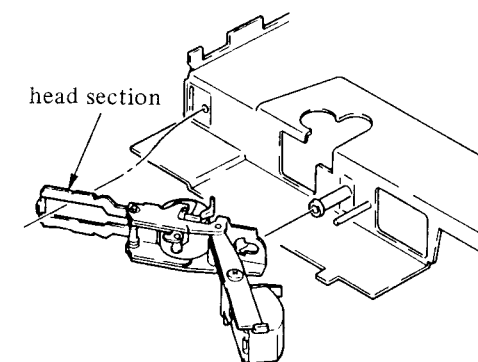
[REW]

When 337 button is pressed, the REW lever is locked by the lock plate, S303-1 and lever (C) is pressed and FR lever (A) is pressed.

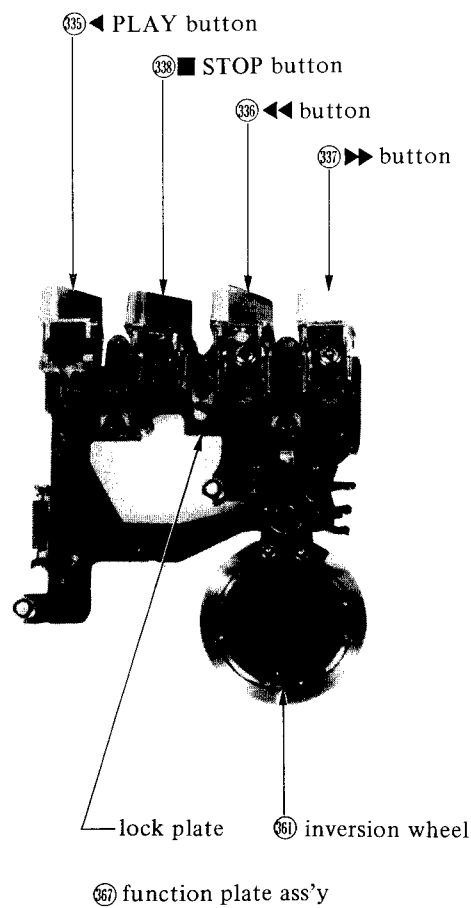
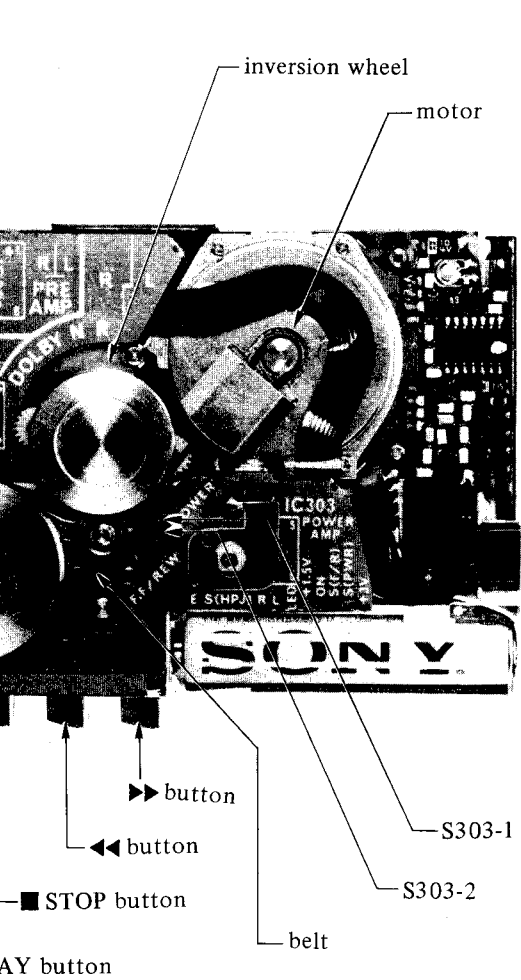
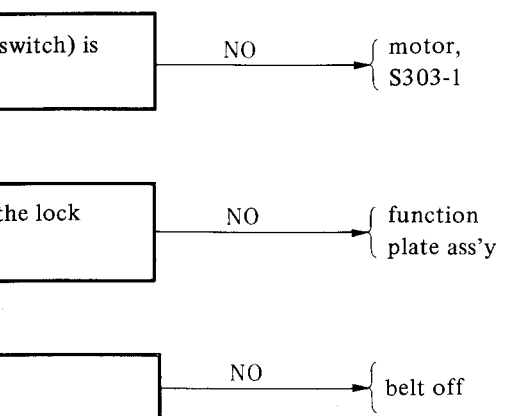
Motor rotation is transmitted in this order: motor → belt → 361 inversion wheel → 369 S reel gear.

[STOP]

When 338 STOP button is pressed, PLAY lever, FF lever and REW lever locks and turn off, and tape transport operation stops.



common for each mode, so if these are not
e.



Reference

When checking, it is easier to see the operation if power is turned off and the flywheel is rotated by hand.

[FWD]

When the  **PLAY** button is pressed, the **PLAY** lever is locked by the lock plate, S303-1 goes on, and the head comes into contact with the tape.

Motor rotation is transmitted in this order: motor → belt → ③⑥① inversion wheel → ③⑥② T reel gear assy

[FF]

When  button is pressed, the FF lever is locked by the lock plate, S303-1 and S303-2 go on,  FR lever (C) is pressed, FR lever (A) is pressed. Motor rotation is transmitted in this order: motor → belt →  inversion wheel →  T reel gear ass'y small gear →  T reel gear ass'y.

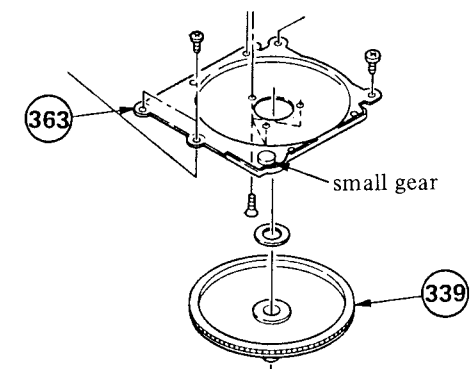
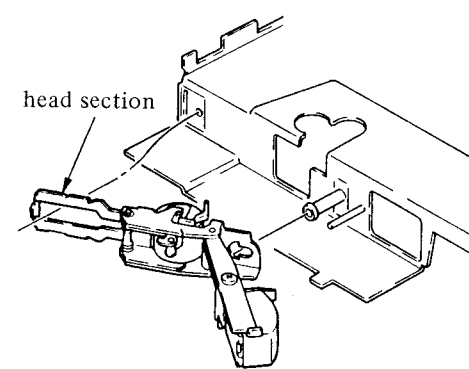
[REW]

When  button is pressed, the REW lever is locked by the lock plate, S303-1 and S303-2 go on,  FR lever (C) is pressed and FR lever (A) is pressed.

Motor rotation is transmitted in this order: motor → belt → 361 inversion wheel → 363 motor chassis ass'y
small gear → 339 S reel gear.

[STOP]

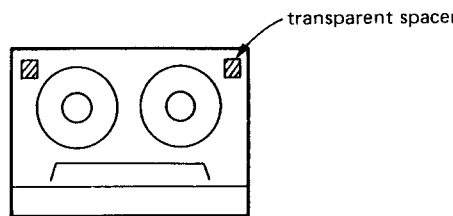
When STOP button is pressed, PLAY lever, FF lever and REW lever locks are released, S303-1 and S303-2 turn off, and tape transport operation stops.



• Defective Tape Transport II

- Defective tape transport
- Noise
- Wow/flutter
- No shut-off
- Shuts off during tape transportation
- Defective button operation
- Tape winds around pinch roller during FWD
- Tape is damaged during ejection

• Defective tape transport

Cause	Defective Location
1) Capstan shaft and roller not parallel. 2) Cassette inserted position not good.	 transparent spacer Stick transparent spacers (Luminer) at left or right, or both. Luminer No. 3-315-483-01 (5x5x0.35)

• Noise

Cause	Defective Location
1) Foreign object in gears. 2) 364 T reel shaft bent. 3) 363 S reel table warped.	Replace parts. Rotate T, S reel tables and check that there is no noise or catching.

• Wow/Flutter

Cause	Defective Location
1) Imperfection in 331 capstan bush. 2) Not enough oil between 331 capstan bush and 366 sleeve. 3) 362 pinch roller dirty. 4) No 357 flywheel thrust play.	1) Replace parts. 2) Lubricate, but be careful not to apply too much. 3) Cleaning. But be careful that the shut-off lever spring under pinch roller does not come off. 4) Play is lost when mounting the capstan bush; pull the flywheel gently to get clearance.

• No Shut-off

Cause	Defective Location
1) Defective positioning between 362 shut off lever (pinch roller) and 366 shut-off gear C (sleeve ass'y). 2) 367 function plate ass'y lock plate release operation heavy.	1) Move 366 sleeve ass'y to the right as seen from the rear. 2) Replace 367 function plate ass'y.

• Shuts off during tape transportation

Cause	Defective Location
1) Play lever and lock plate lock separates during FWD. 2) 308 shut-off lever return spring comes off.	1) Replace 367 function plate ass'y. Check: With power off, lock FWD, then if button is released when the pinch roller is pushed to the button side, the lock is defective. 2) Replace 308 shut-off lever return spring or 362 shut-off lever (pinch lever ass'y)

• Defective Button Operation

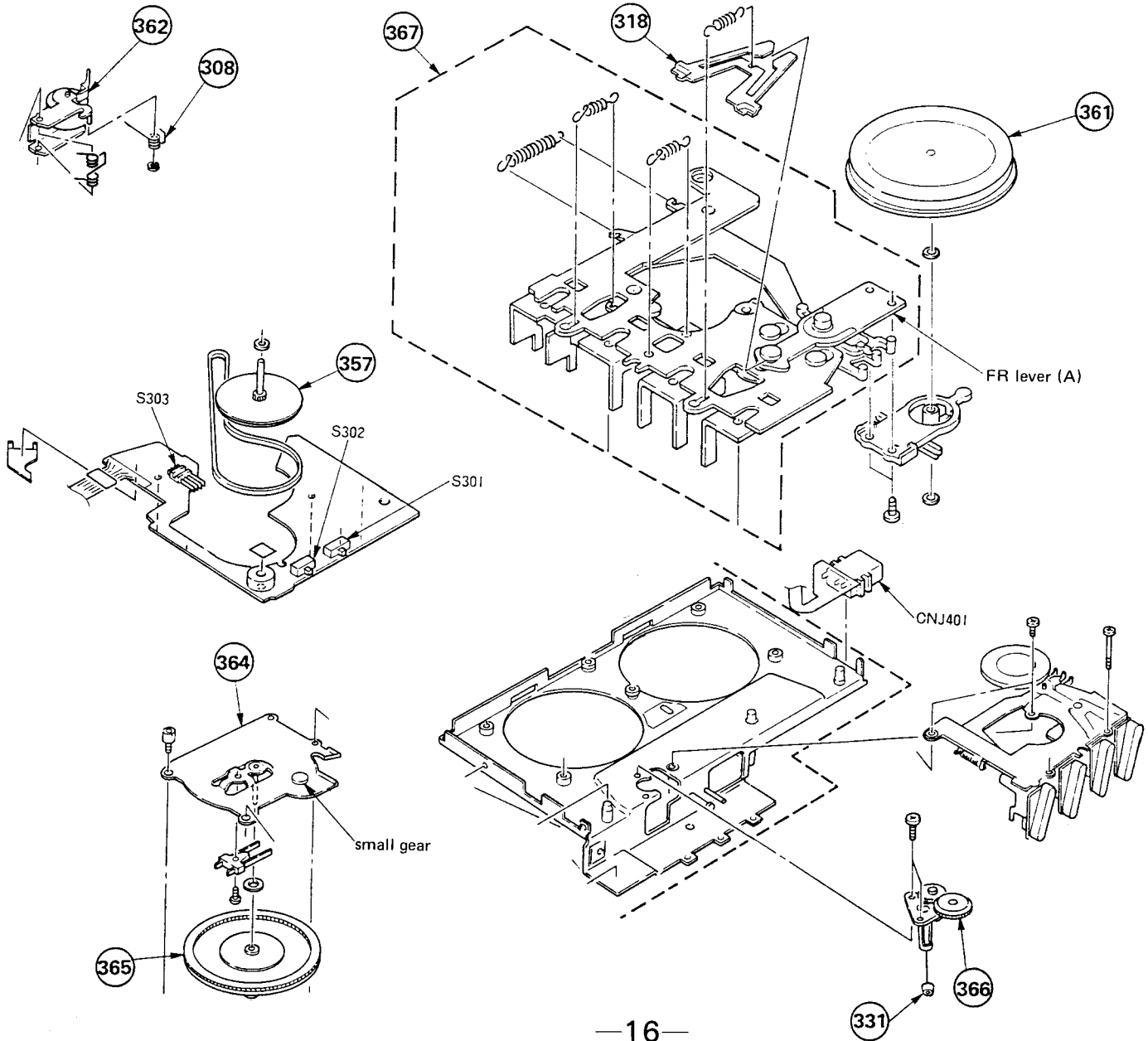
Cause	Defective Location
Lock plate plane and button lever bent.	Replace 367 function plate ass'y.

• Tape winds around pinch roller during FWD

Cause	Defective Location
The inversion wheel has vertical play, so because of shock, etc. there is a gear behind the inversion wheel, but that gear disengages with the other gear.	FR lever (A) bending adjustment as shown below (for better gear engagement).

• Tape is damaged during ejection

Cause	Defective Location
Tape catches because of imperfection on part of 366 sleeve comp ass'y.	Replace 366 sleeve comp ass'y.



REPAIR KNOW HOW

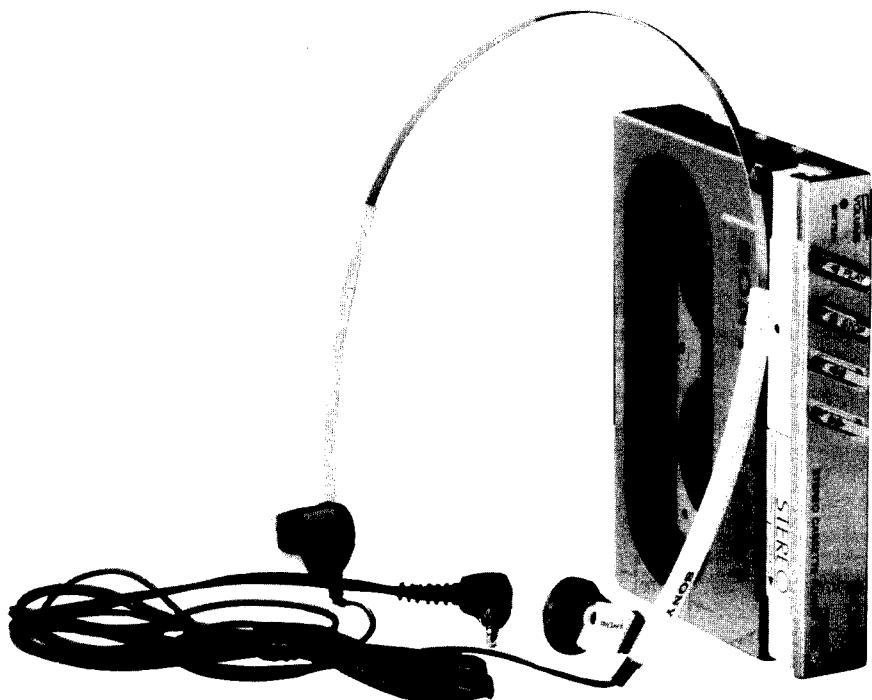
DESCRIPTION	CAUSE	REPAIR
NO OPERATION	MOTOR COIL SHORT CIRCUITING FPCB CUT AT HP JACK PORTION BRIDGE BETWEEN R302 AND S302 NG BELT	
NO OPERATION WITH BATT	NG SOLDERING AT DC JACK PORTION BATT⊕ WITH LEADWIRE PULLED	
NO OPERATION WITH EXT POWER	NG CONTACTS OF EXT POWER JACK	
NO FF	NG S303-2 CONTACT	
NO SOUND	S303-2 TOUCHING HEAD LEADWIRE TORN VOL (RV301) DEFECTIVE NG HEAD LEADWIRE (YEL) SOLDERING	
NO ONE CH SOUND (OSCILLATION)	NG C102, C202 SOLDERING	
NO ONE CH SOUND/BIG NOISE	HEADPHONE DEFECTIVE	
NO ONE CH SOUND	RV301 DEFECTIVE	
SOUND REMAINS IN SMALL	INCREASE C303 VALUE	
AMP NOISE	BATT LEADWIRE PRESSED	
L-CH NOISE	POWER IC (IC303) DEFECTIVE	
BUZZER SOUND	BATT⊕ TERMINAL DIRTY	CONTACTS CLEANING (DAIFRON SOLVENT)
HUM NOISE HUM NOISE IS OK WHEN LED GOES OUT	BATT⊕ TERMINAL DIRTY	CONTACTS CLEANING (DAIFRON SOLVENT)
INTERMITTENT SOUND	BATT⊖ TERMINAL DIRTY	CONTACTS CLEANING (DAIFRON SOLVENT)
LOW POWER NOISE INTERMITTENT SOUND OR NOISE WITH SHOCK	BATT TERMINAL NO RESILIENT	
NOISE WHEN PRESSING UNIT	NG GROUND PLATE SOLDERING	
MOTOR NOISE	MOTOR WHEEL AND COIL TOUCHING NO C305 SOLDERING	
FRICTION NOISE	MAGNET AND COIL TOUCHING	
MONOURAL SOUND WHEN TURNING VOL	VOL (RV301) DEFECTIVE	
OSCILLATION	AUDIO PCB PATTERN TOUCHES TO REW. BUTTON/ NG GROUND PLATE SOLDERING	
BATT HEAT	MOTOR COIL (HALL DEVICE OPEN)	
SLOW SPEED WITH SHOCK	COIL SHORTCIRCUITING	
TOO FAST SPEED	NG SOLDERING AT MOTOR TERMINAL	
NO FF/REW ROTATION	ROTATION SW SHORT CIRCUITING WITH SOMETHING	
FF/REW AUTO-OFF	NG ROTATION SW (S901) SOLDERING	
NO STOP WHEN STOP BUTTON RELEASED	S303-1 TOUCHING TO FPCB FPCB PATTERN BRIDGE AT DC JACK PORTION	RESOLD S303-1

WM-20

SERVICE MANUAL

Refer to MDR-W30L Service Manual issued previously for information of headphones supplied with this set.

*AEP Model
UK Model
E Model*



SPECIFICATIONS

Tape track: 4-track 2-channel stereo
Fast winding time: Approx. 2 min. with Sony cassette C-60
Frequency response (DOLBY NR OFF)
40-15,000 Hz (with the TAPE selector set to CrO_2)
40-15,000 Hz (with the TAPE selector set to METAL)
40-15,000 Hz (with the TAPE selector set to NORM)
Power output: 5 mW $\times$ 2 (max.)
5 mW $\times$ 2 (at 10% harmonic distortion) at dc operation
Power requirements: 1.5 V dc
Size AA battery (IEC designation R6)
External batteries (used in the optional battery case EBP-10): size AA (IEC designation R6) $\times$ 2
DC IN 1.5 V jack accepts: Sony AC-D1 ac power adaptor (optional)
for use on 120 V ac or Sony DCC-70 car battery cord (optional)
for use with 12 V car battery.
Battery life (continuous playback hours):
Approx. 2.5 hours with supplied Sony SUM-3 (NS) New Super battery
Approx. 5 hours with Sony Eveready AM3 alkaline battery
For maximum performance we recommend the use of alkaline battery.
Dimensions: Approx. 69.5 $\times$ 109.5 $\times$ 17.6 mm (w/h/d)
(2 $\frac{3}{4}$ $\times$ 4 $\frac{1}{8}$ $\times$ 2 $\frac{1}{16}$ inches)
not incl. projecting parts and controls
Weight: Approx. 180 g (6.4 oz) incl. battery, not incl. other accessories

'Dolby' and the double-D symbol are the trade marks of
Dolby Laboratories Licensing Corporation. Noise reduction
system manufactured under license from Dolby Laboratories
Licensing Corporation.

STEREO CASSETTE PLAYER
SONY®



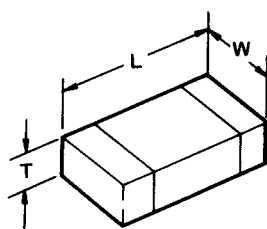
TC

• Chip components

Chip components include resistors, capacitors, transistors, diodes, coil and adjustable resistors.

In this section, the types of resistors, ceramic capacitors, transistors and diodes which are used most frequently will be described.

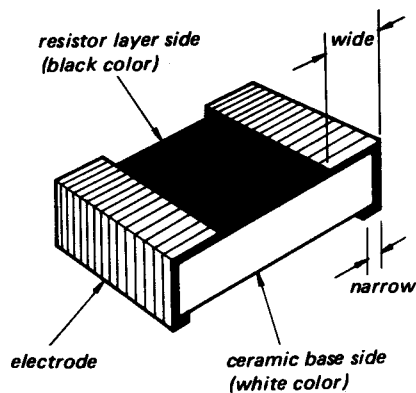
Dimension of transistors and capacitors



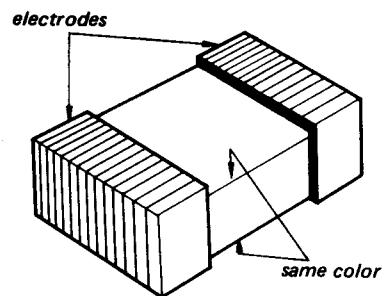
(Unit: mm)

Type	L	W	T
3216	3.2	1.6	0.45 ~ 0.6
2125	2.0	1.25	0.35 ~ 0.5

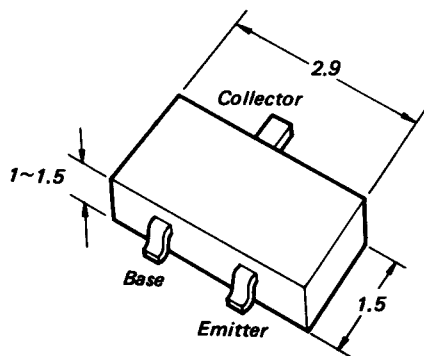
Identification



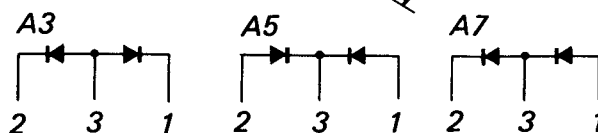
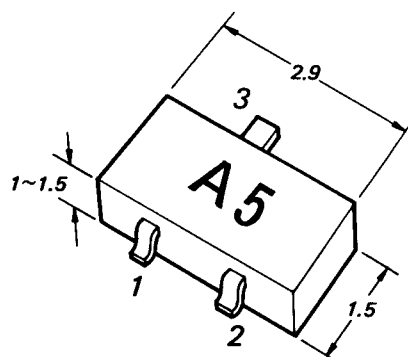
Resistor



Laminated Ceramic Capacitor



Transistor



Diode

Replacing chip components

All chip components should be connected and disconnected, using a tapered soldering iron [temperature of the iron tip: less than 280°C (536°F)], a pair of tweezers and braided wire.

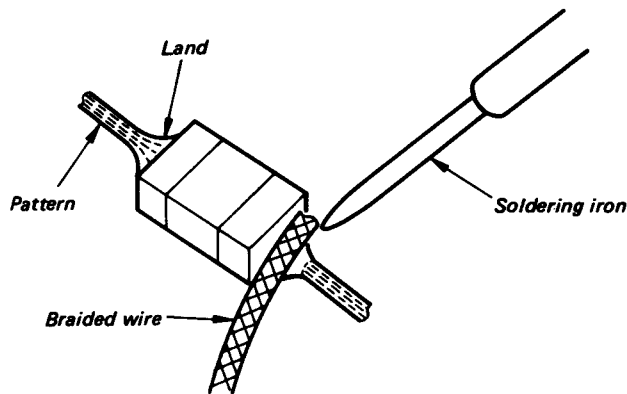
Precautions for replacement

1. Do not disconnect the chip component forcefully. Otherwise, the pattern may peel off.
2. Never re-use a disconnected chip component. Dispose of all old chip components.
3. To protect the chip component, heating time for attaching the component should be within 3 seconds.

○ Removing chip components

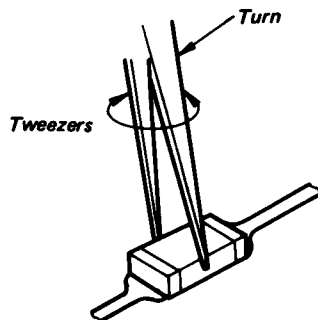
(1) Removing solder at electrode

Remove the solder at the electrode, using a thin braided wire. Do not remove the solder of the part (chip component) attached adjacent to the electrode.



(2) Disconnecting chip components

Turn the tweezers with the soldering iron alternately applied to both electrodes, and the chip component will be disconnected. Take careful precautions while disconnecting, because if the chip component is forcefully removed the land may peel off. Never re-use a disconnected chip component.



(3) Smoothing the soldered surface

After disconnecting the chip component, remove the solder by using a braided wire to smooth the land surface.

○ Connecting chip components

The value of chip components is not displayed on the main body. Take due precautions to avoid mixing new chip components with other ones.

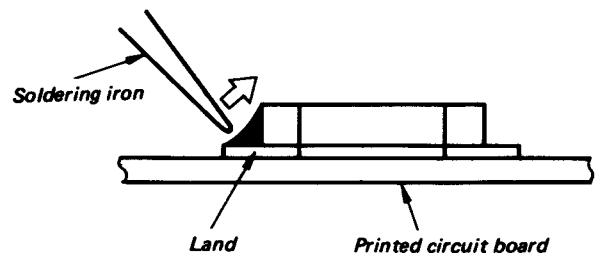
(1) Applying solder to land on one side

Apply a thin layer of solder to the land on one side where the chip component is to be connected. Too much solder may cause bridging.



(2) Speedy soldering

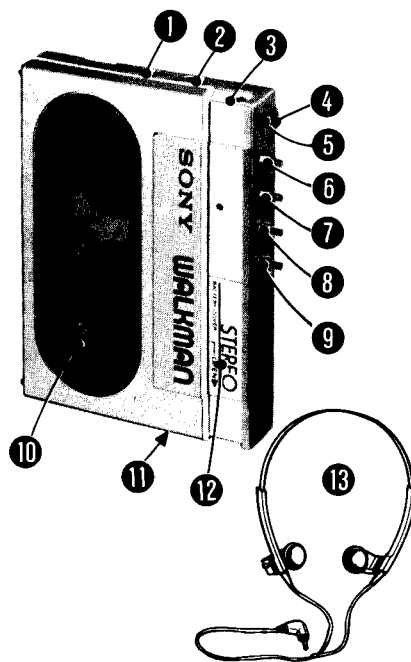
Hold the chip component at the desired position, using tweezers, and apply the soldering iron in the arrow-marked direction. To protect the chip component, heating time should be within 3 seconds.



(3) Speedy soldering of electrode on the other side

Solder the electrode on the other side in the same way as in (2) above.

PARTS IDENTIFICATION



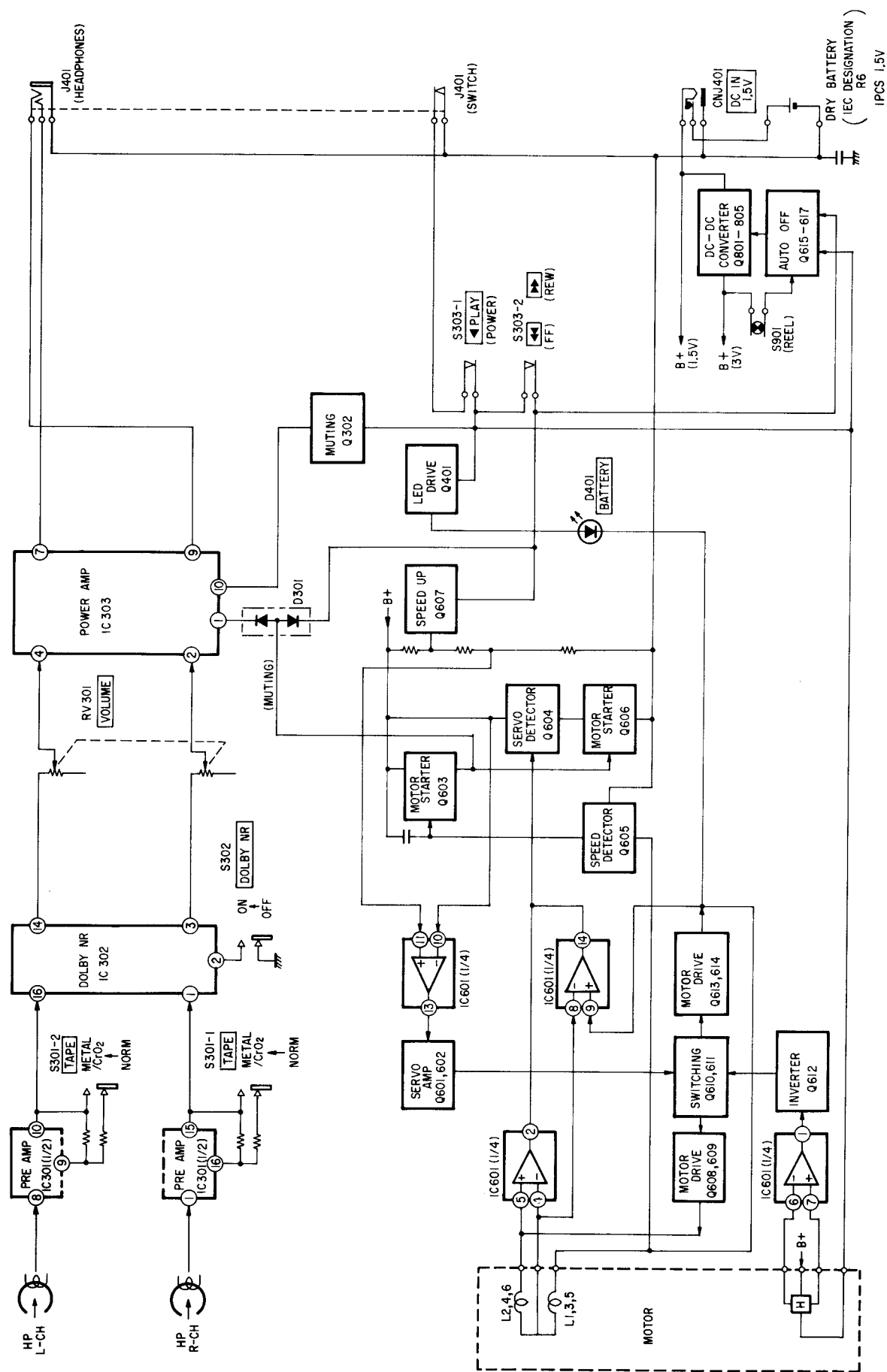
- ① TAPE selector ② DOLBY NR switch ③ Headphones jack
④ VOLUME control ⑤ Battery indicator ⑥ ◀ PLAY button
⑦ ■ STOP button ⑧ ◀◀ button ⑨ ▶▶ button
⑩ Cassette holder ⑪ DC IN 1.5 V (external power input) jack
⑫ Battery compartment ⑬ Stereo headphones (supplied)

MEMO

Handwriting practice lines consisting of 30 horizontal dotted lines.

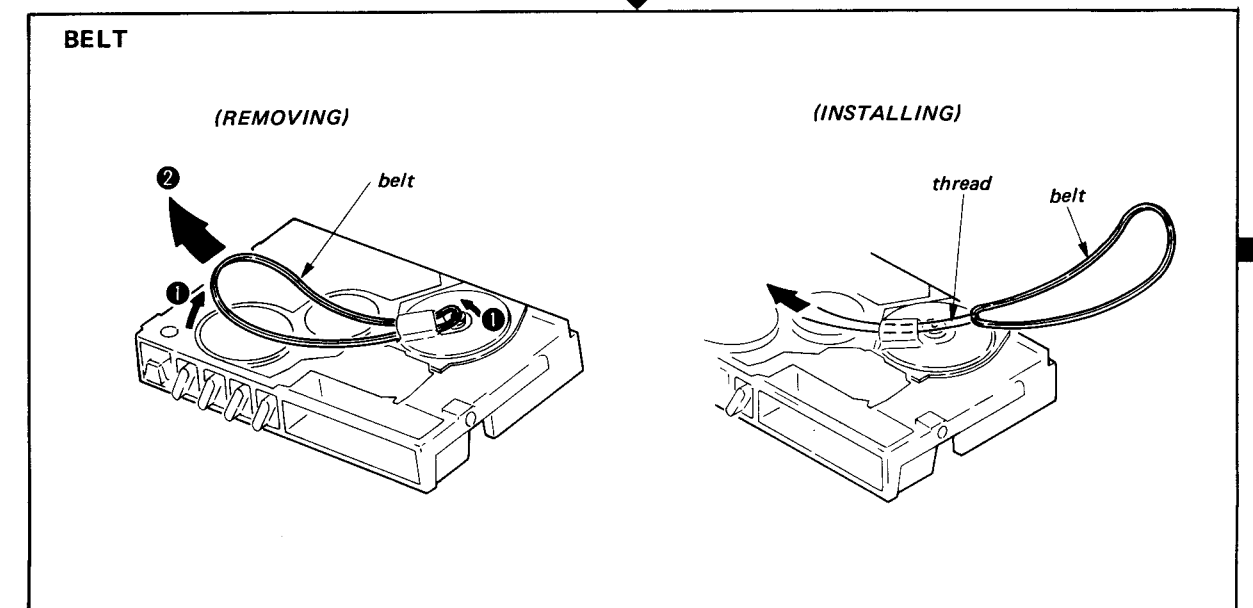
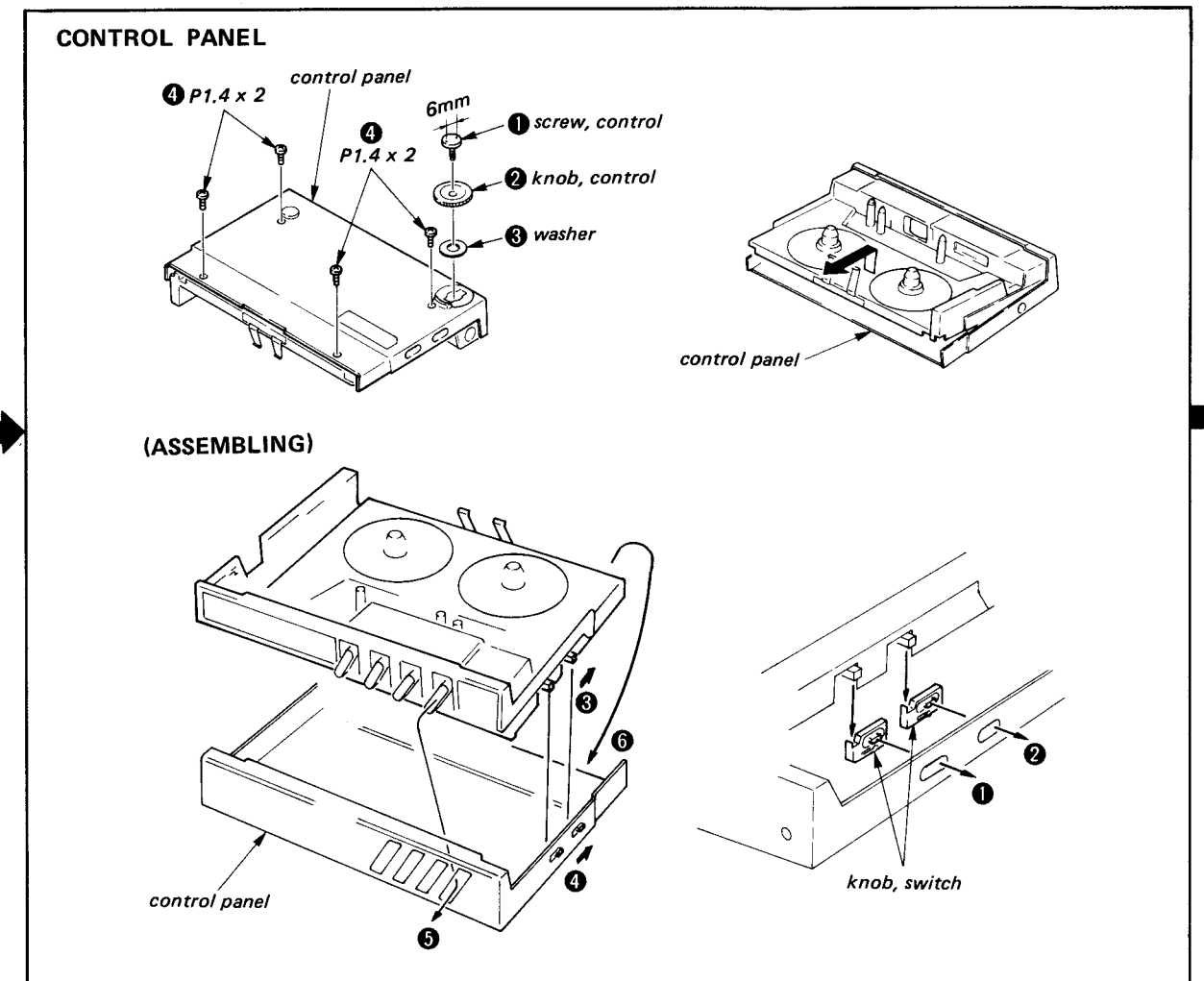
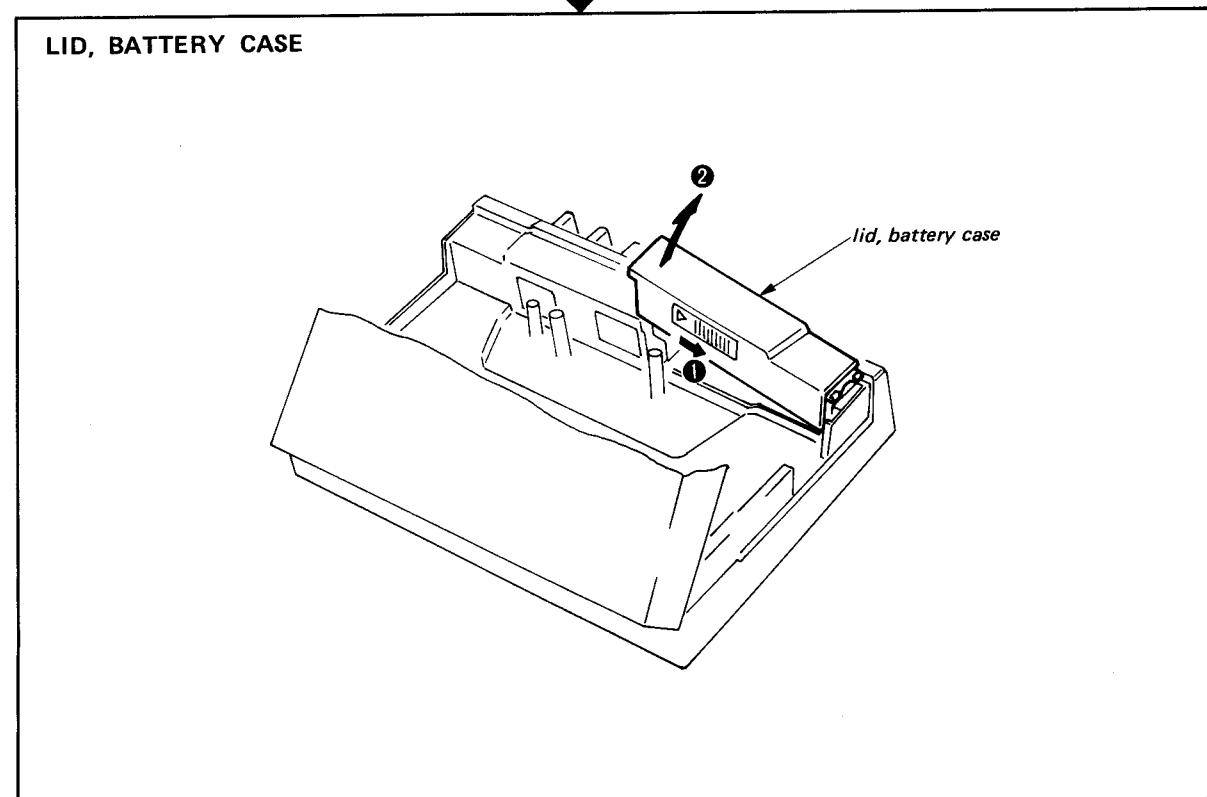
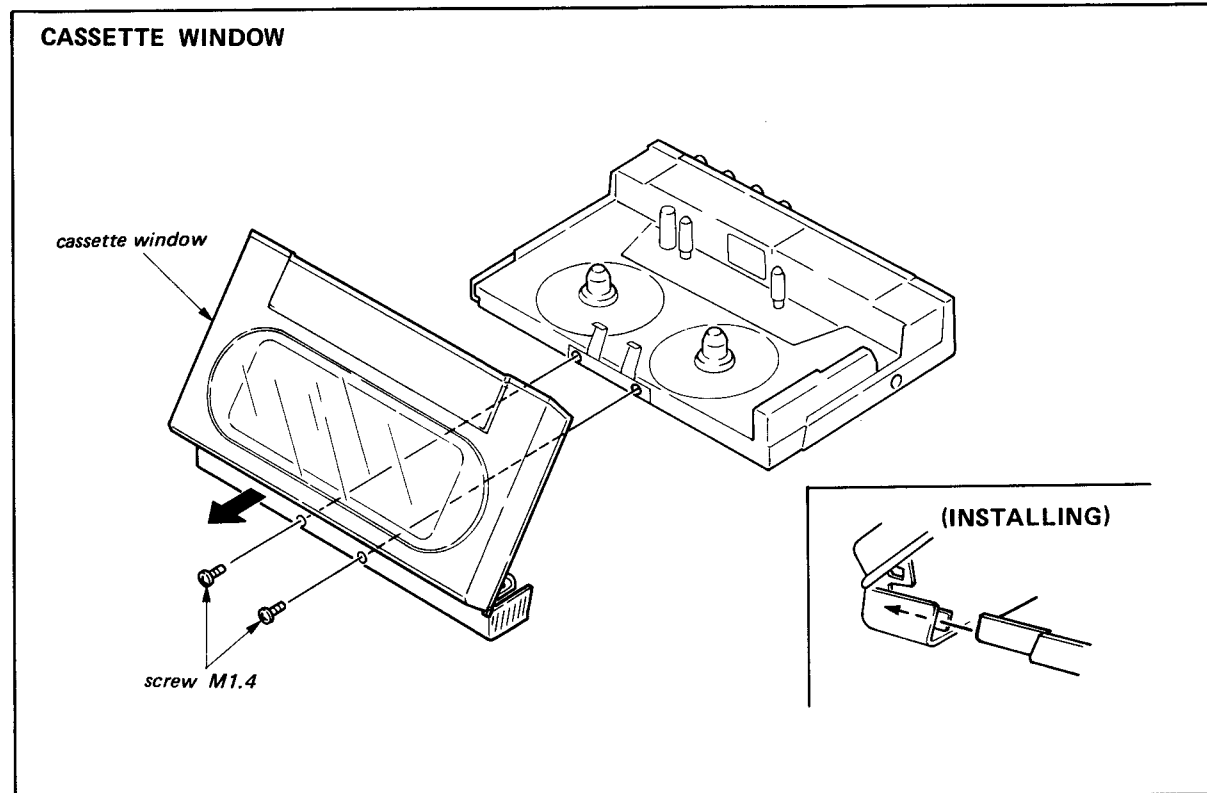
SECTION 1
OUTLINE

1-1. BLOCK DIAGRAM



SECTION 2 DISASSEMBLY

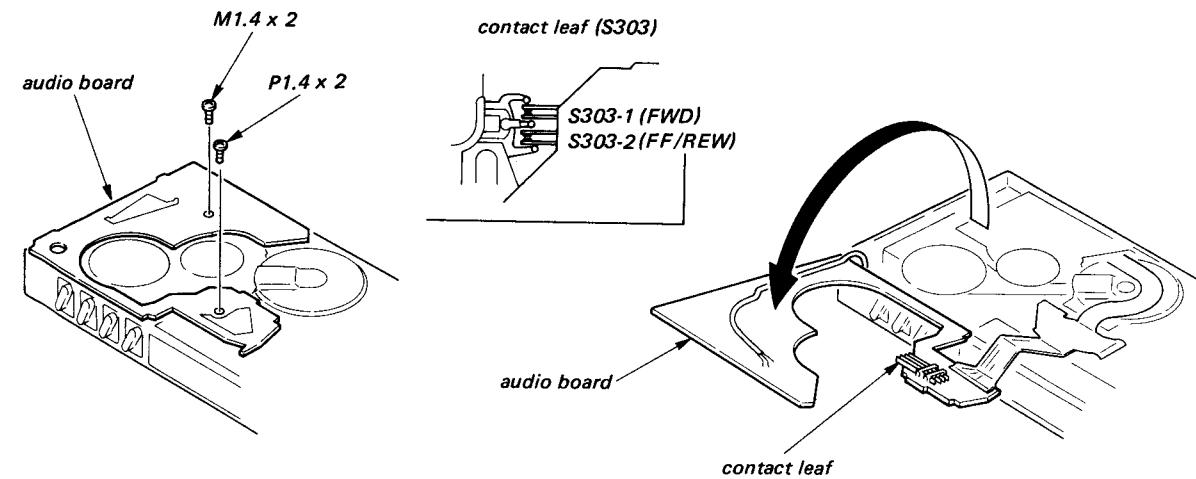
Note: Follow the disassembly procedure in the numerical order given.



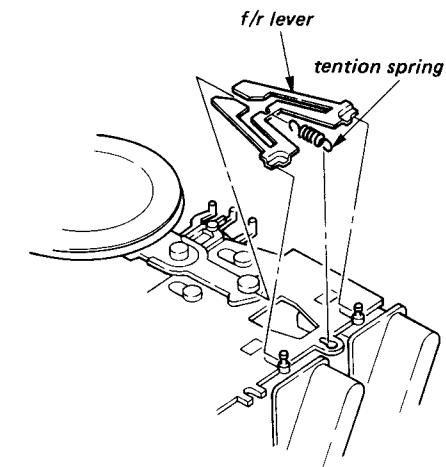
to P. 13 MOTOR BLOCK

AUDIO BOARD

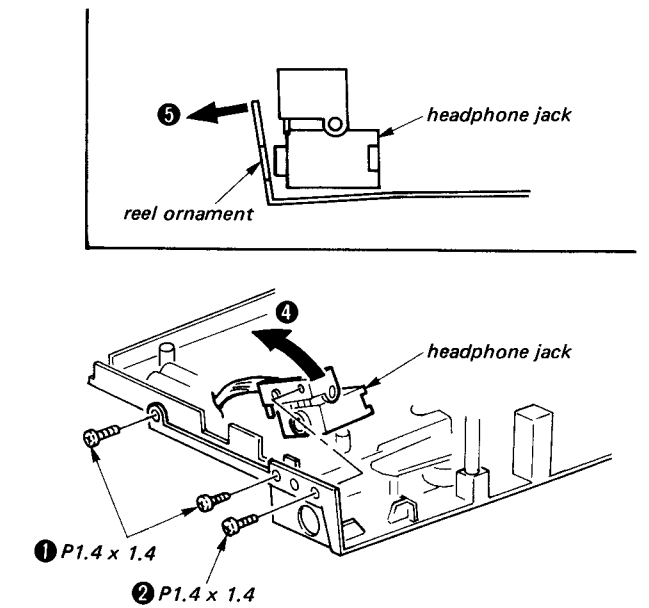
• When removing and installing the audio board, be careful not to bend the contact leaf.



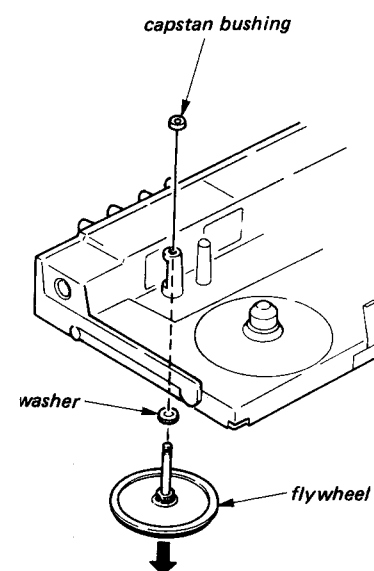
F/R LEVER



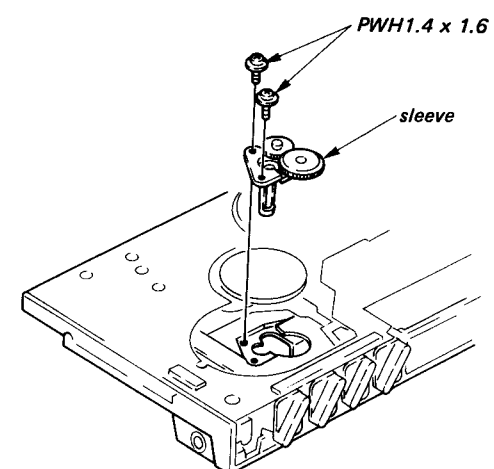
HEADPHONE JACK



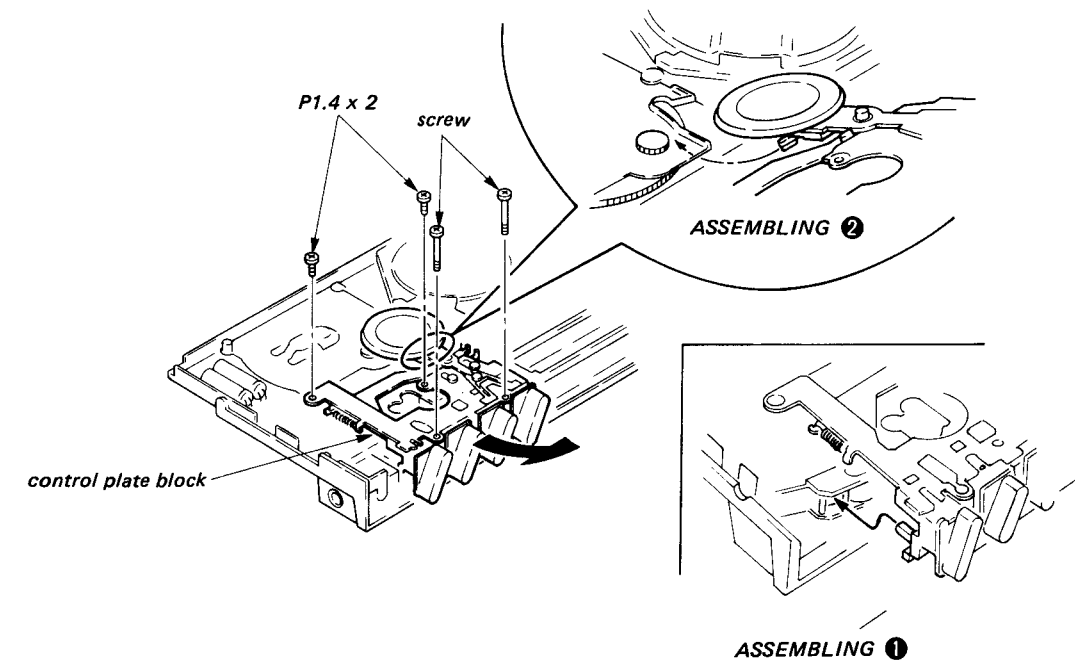
FLYWHEEL



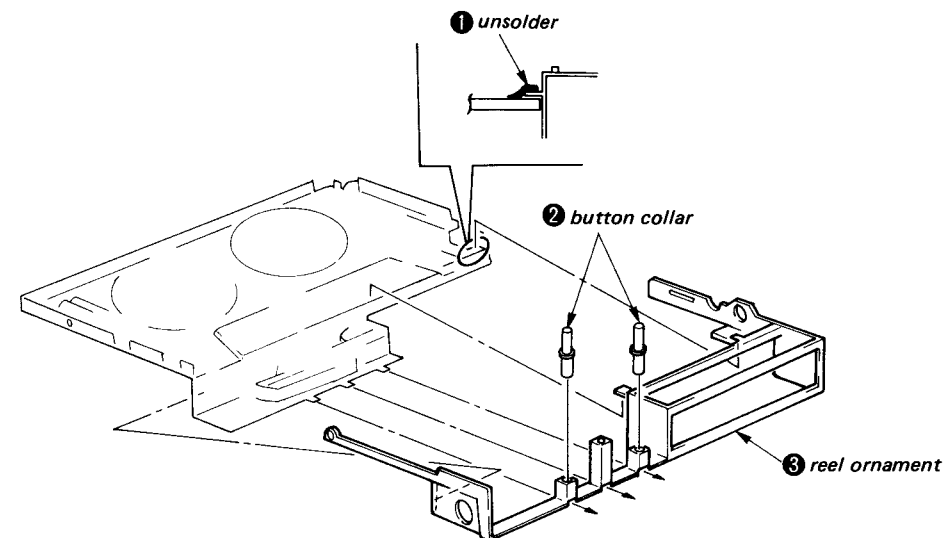
SLEEVE



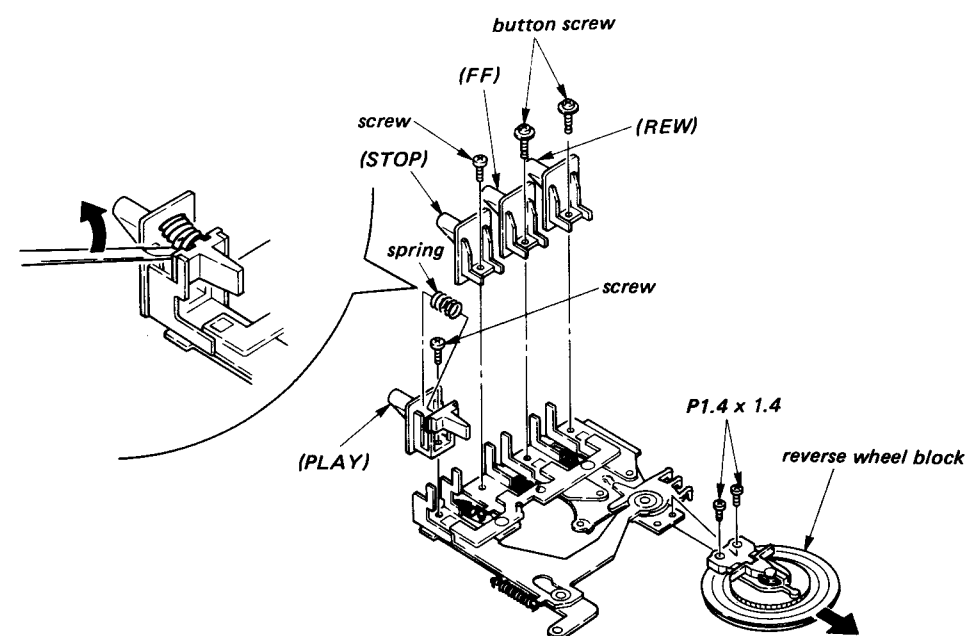
CONTROL PLATE BLOCK



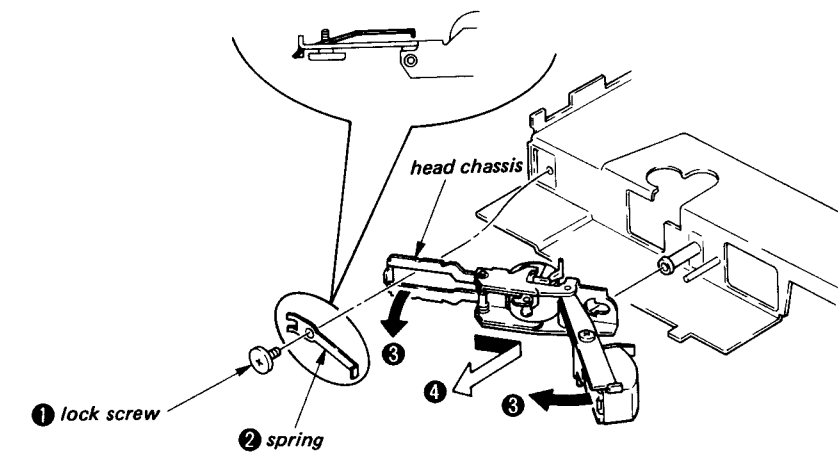
REEL ORNAMENT



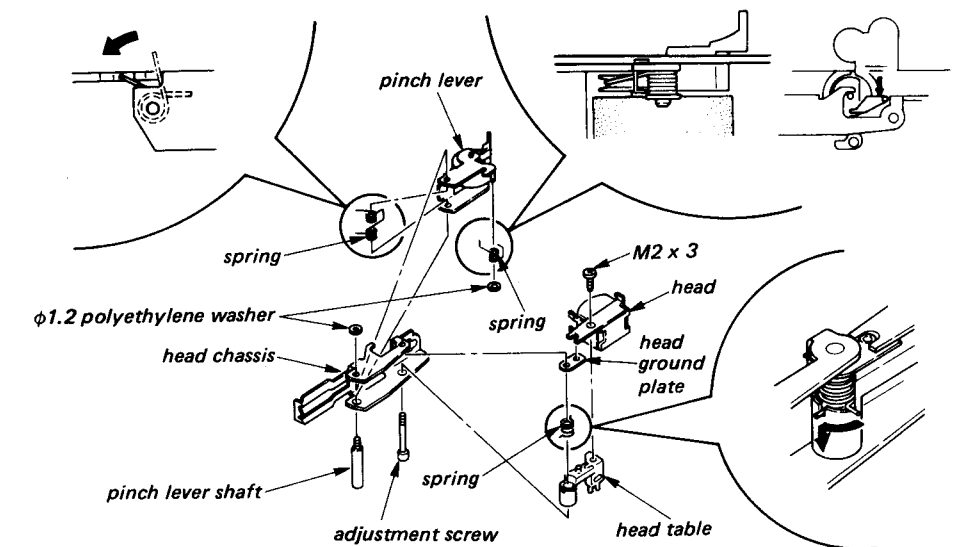
BUTTON (PLAY, STOP, FF, REW), REVERSE WHEEL BLOCK



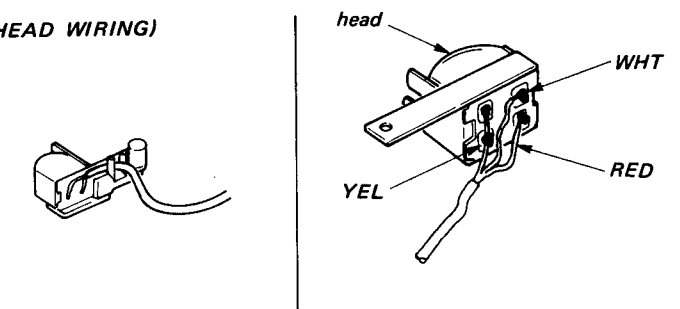
HEAD CHASSIS



(ASSEMBLING)

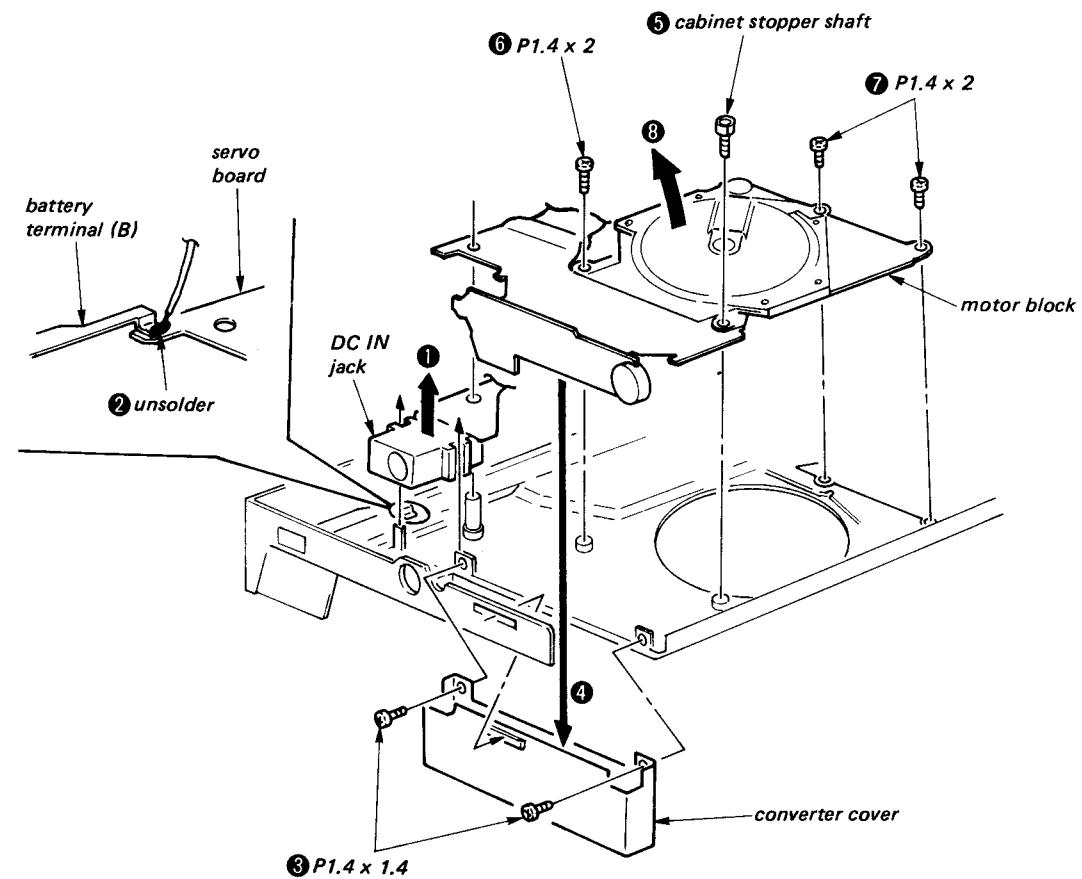


(HEAD WIRING)

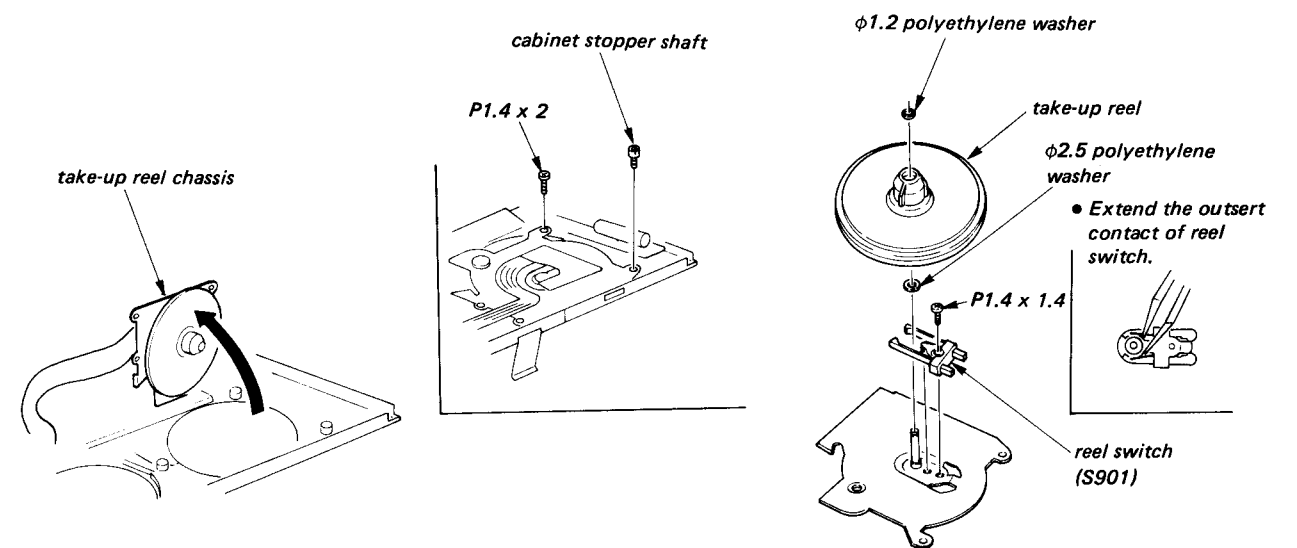


from AUDIO BOARD

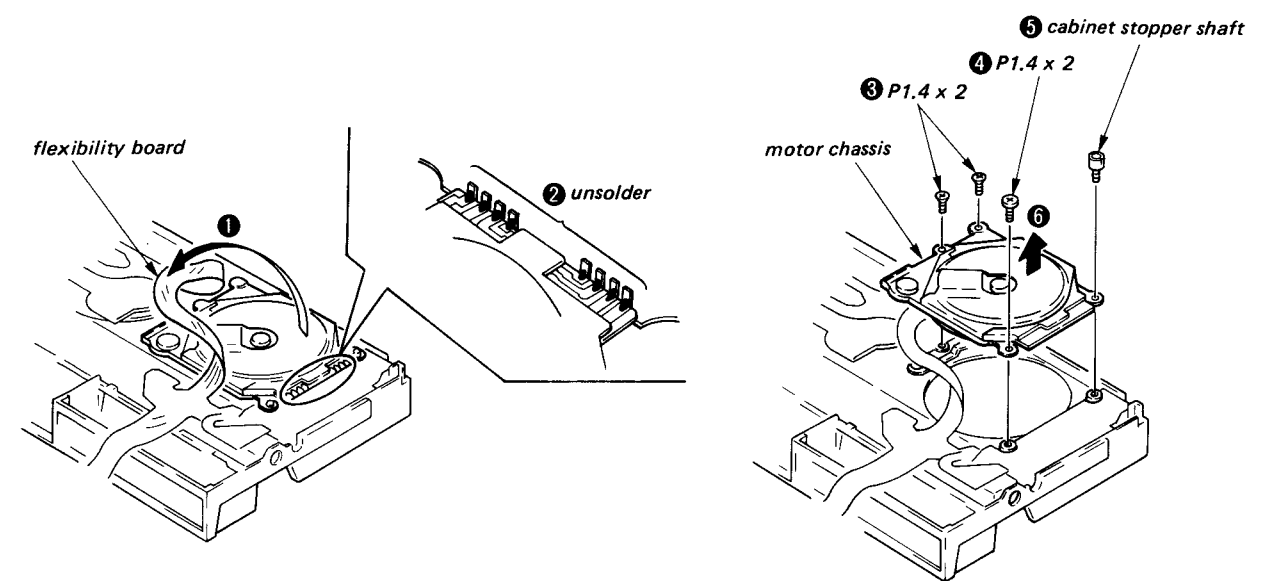
MOTOR BLOCK



TAKE-UP REEL



MOTOR CHASSIS



SECTION 3 ADJUSTMENTS

PRECAUTION

- Clean the following parts with a denatured-alcohol-moistened swab:

playback head	pinch roller
capstan	rubber belts
- Demagnetize the playback head with a head demagnetizer.
- Do not use a magnetized screwdriver for the adjustments.
- After the adjustments, apply suitable locking compound to the parts adjusted.
- The adjustments should be performed with the rated power supply voltage (1.3V) unless otherwise noted.

3-1. MECHANICAL ADJUSTMENTS

Torque Measurement

	Torque meter	Meter reading
FWD	CQ-102B	20 – 40 g·cm (0.28 – 0.56 oz·inch)
FF, REW	CQ-201B	More than 60 g·cm (More than 0.83 oz·inch)
Back Tension	CQ-102B	0 – 2.5 g·cm (0 – 0.03 oz·inch)
Tape Pulling Force	CQ-403	More than 45 g·cm (More than 0.62 oz·inch)

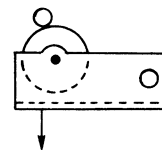
Pinch Roller Pressure Measurement

— Forward Mode —

- Pull the spring scale in the direction shown by the arrow.
- Slowly return the pinch roller and read the spring scale.

Specification:

150 ± 20 g (4.6 – 6.0 oz)



Thrust Clearance Adjustment

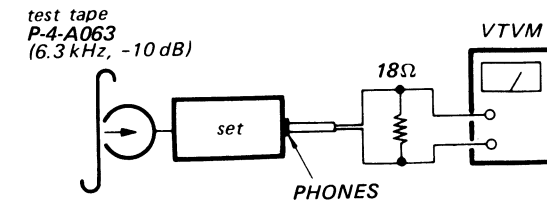
	Thrust clearance
Take-up reel	0.05 – 0.15mm
Supply reel	0.05 – 0.15mm
Reverse wheel	0.05 – 0.15mm

3-2. ELECTRICAL ADJUSTMENT

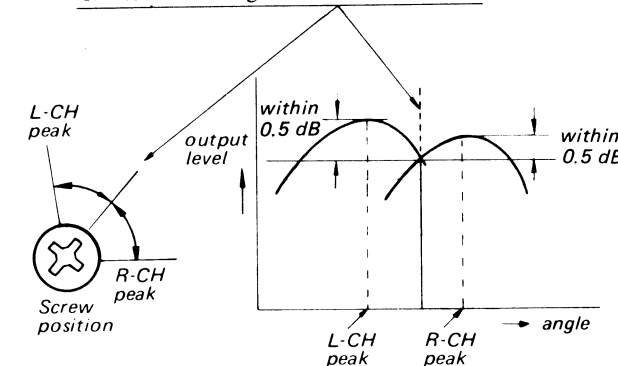
Playback Head Azimuth Adjustment

Procedure:

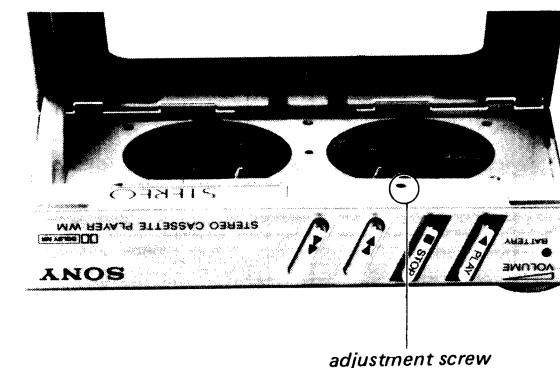
- Mode: playback



- Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 0.5 dB.



Adjustment Location:



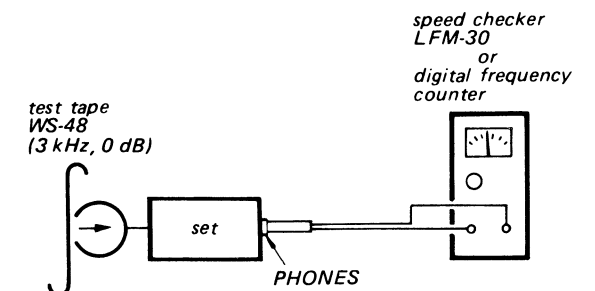
Tape Speed Adjustment

Setting:

VOLUME control: mechanical mid

Procedure:

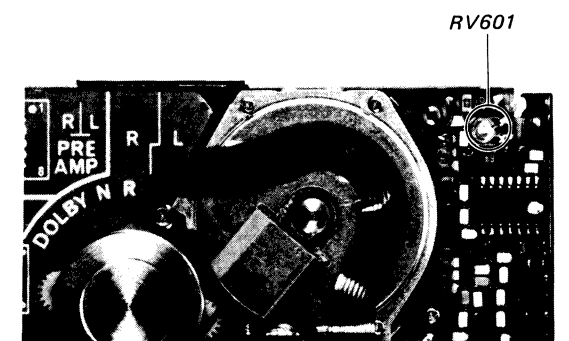
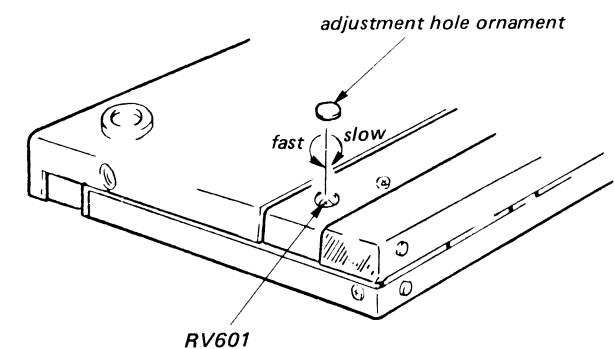
- Mode: playback



Specification:

Speed checker	Digital frequency counter
$\pm 2\%$	2,940 – 3,060 Hz

Adjustment Location:

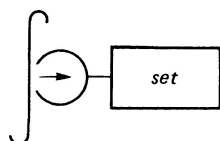


Dolby NR Level Adjustment

Setting:

TAPE switch: NORM
 DOLBY NR switch: off
 VOLUME control: minimum

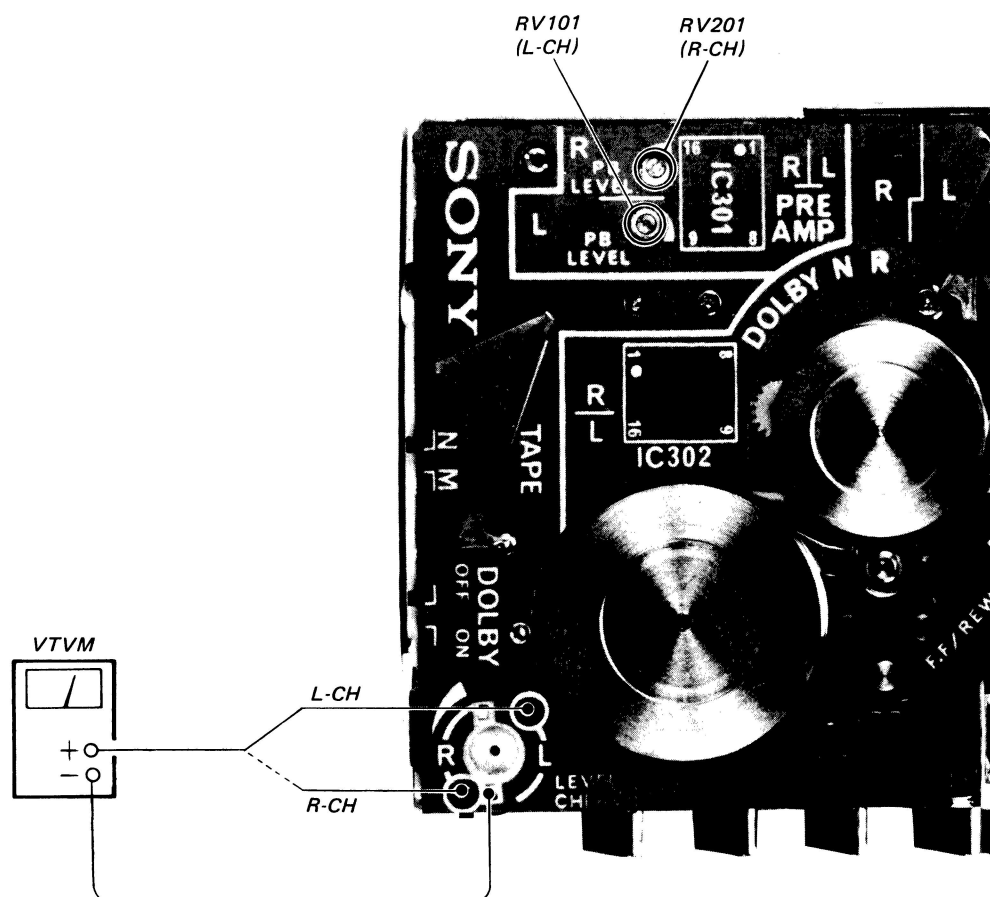
test tape
 P-4-L300
 (315 Hz, 0 dB)



Procedure:

Adjust RV101 (L-CH), RV201 (R-CH) to obtain $-27.7\text{dB} \pm 1\text{dB}$ (0.028V to 0.036V) output level.

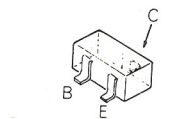
Adjustment Location: audio board



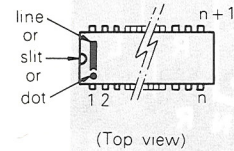
Note
When the headphones are not connected, the unit will not operate.

Semiconductor Lead Layouts

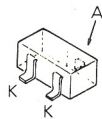
2SA1162
2SA1163
2SB624
2SC1623
DTA114TK
DTC114YK



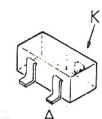
BA3304F
CX20085
CX20089
NJM2901MB



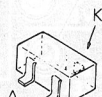
1S2835



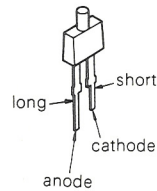
DA106K



RD4.3M-B3



GL9PR22



Note:

- All capacitors are in μF unless otherwise noted. $\text{pF} : \mu\text{F}$ 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, $\frac{1}{10}\text{W}$ unless otherwise noted. $\text{k}\Omega : 1000\Omega$, $\text{M}\Omega : 1000\text{k}\Omega$
- $\square$: panel designation.
- $\square$: adjustment for repair.
- --- : B+ bus.
- Readings are taken under no-signal conditions with an oscilloscope.

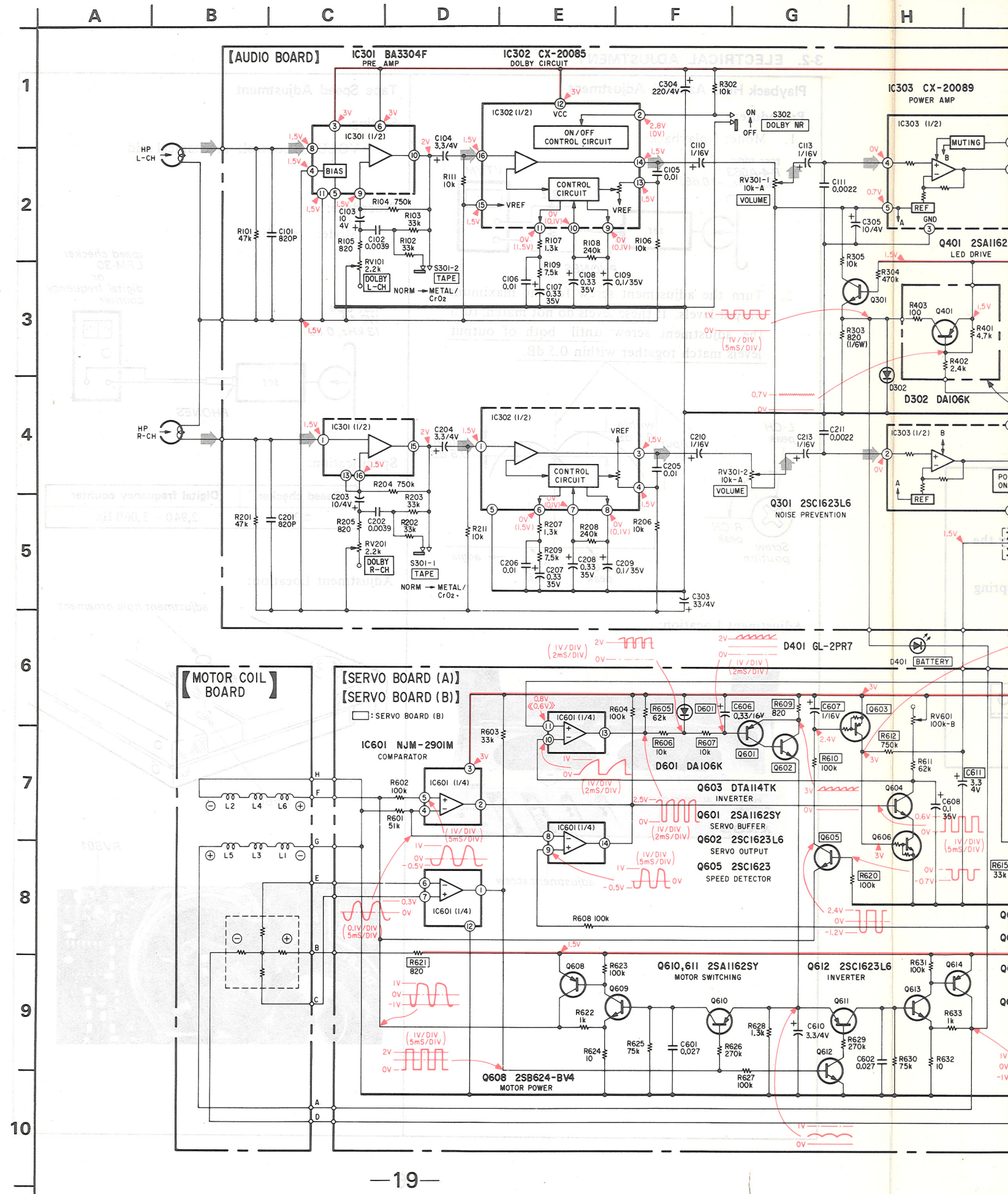
• Switch

Ref. No.	Switch	Position
S301	TAPE	NORM
S302	DOLBY NR	OFF
S303-1	◀PLAY	OFF
S303-2	◀◀/▶▶ (FF/REW)	OFF
S901	Reel	---
J401	Headphones (switch)	OFF

• $\Rightarrow$: signal path.

Note: Voltages are measured with an oscilloscope.

4-1. SCHEMATIC DIAGRAM



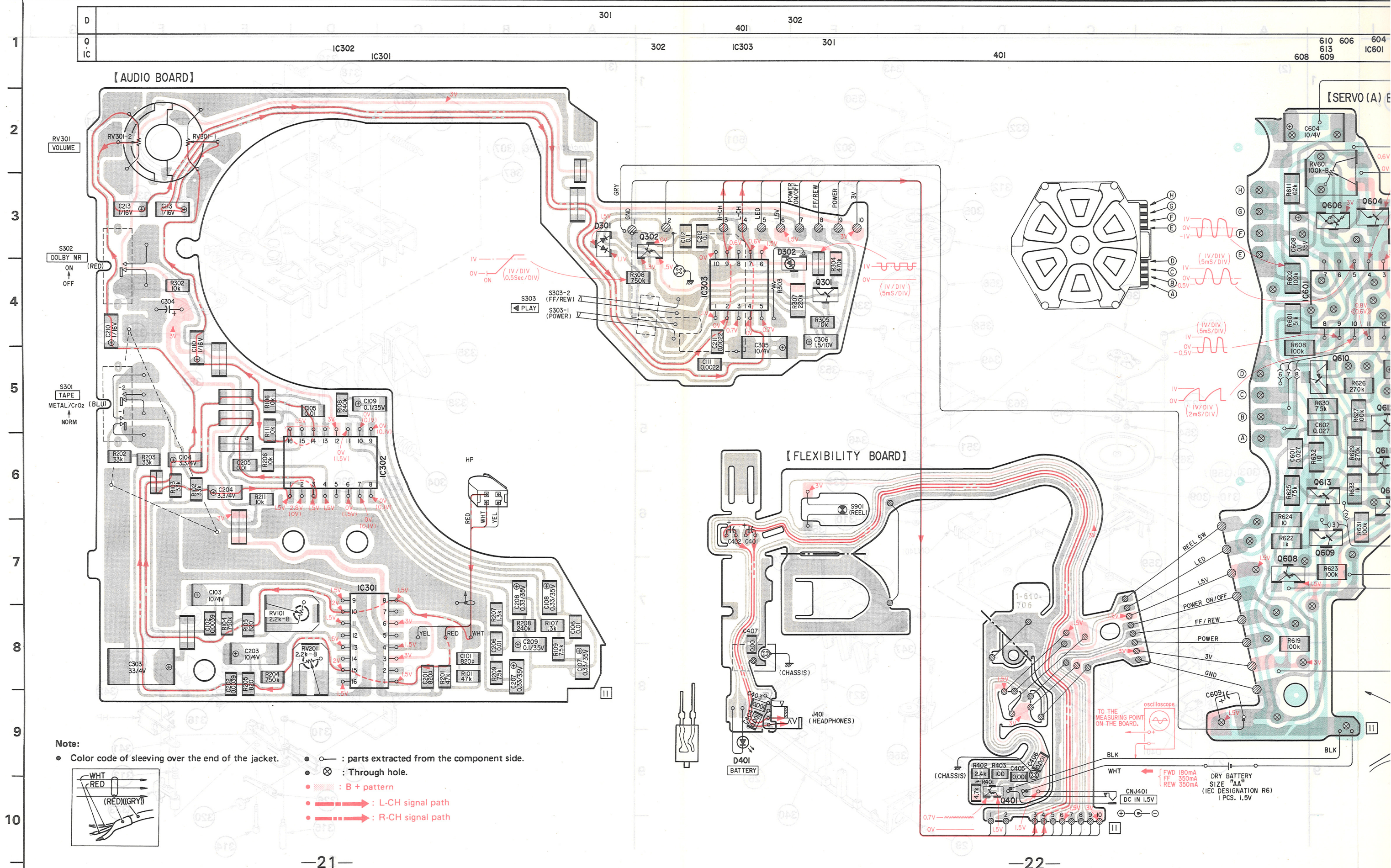
SECTION 3
ADJUSTMENTS

WM-20

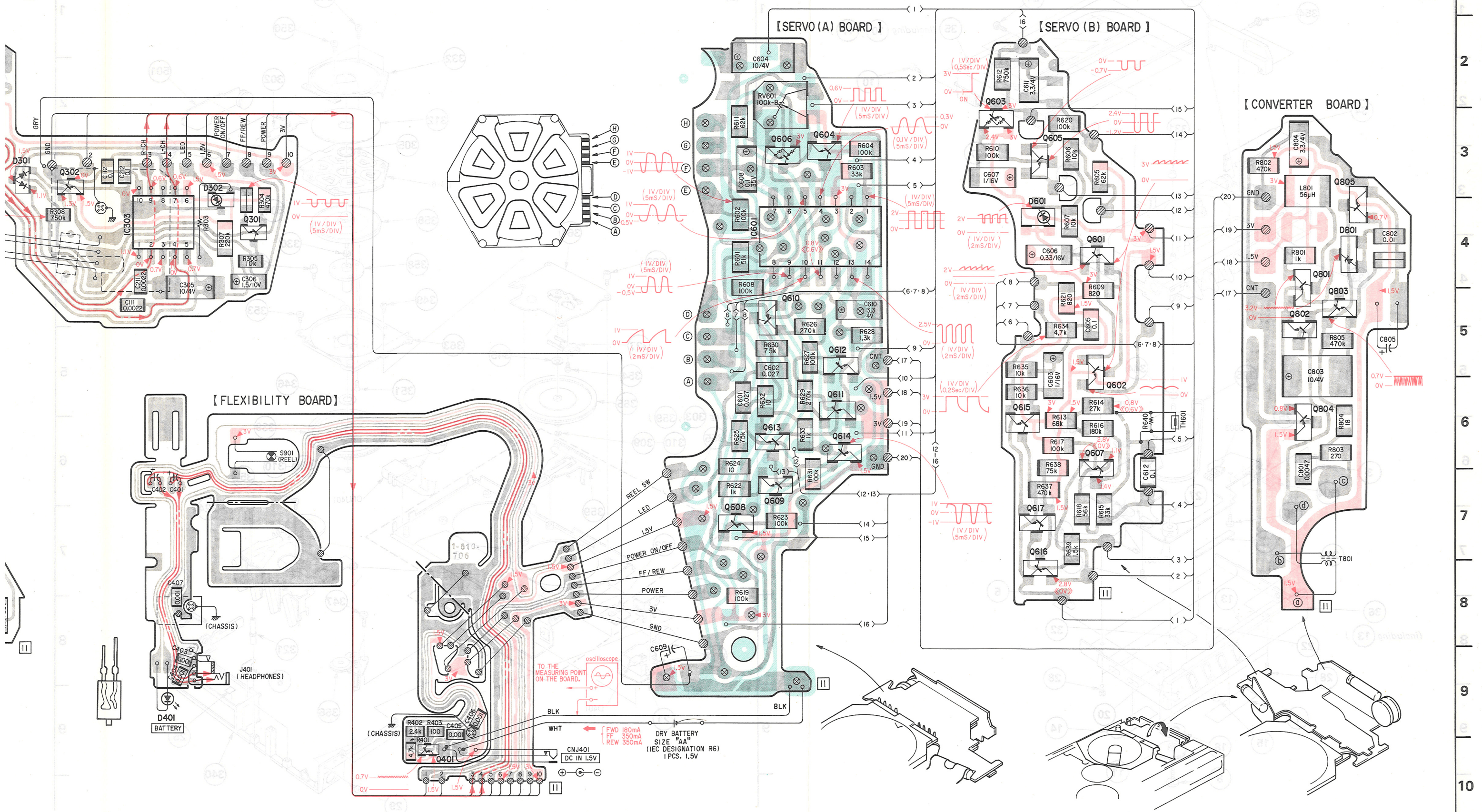


WM-20 **WM-20**

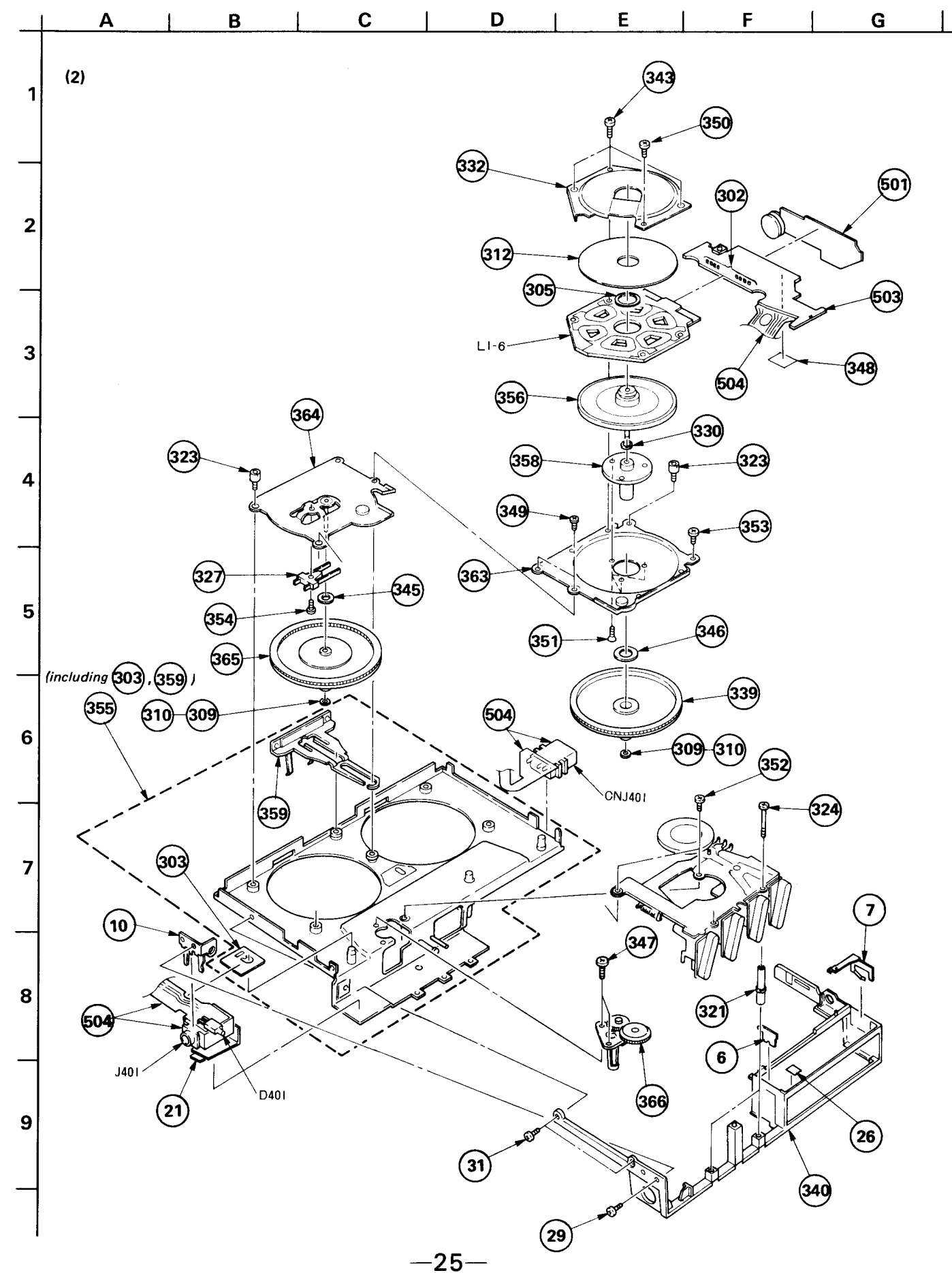
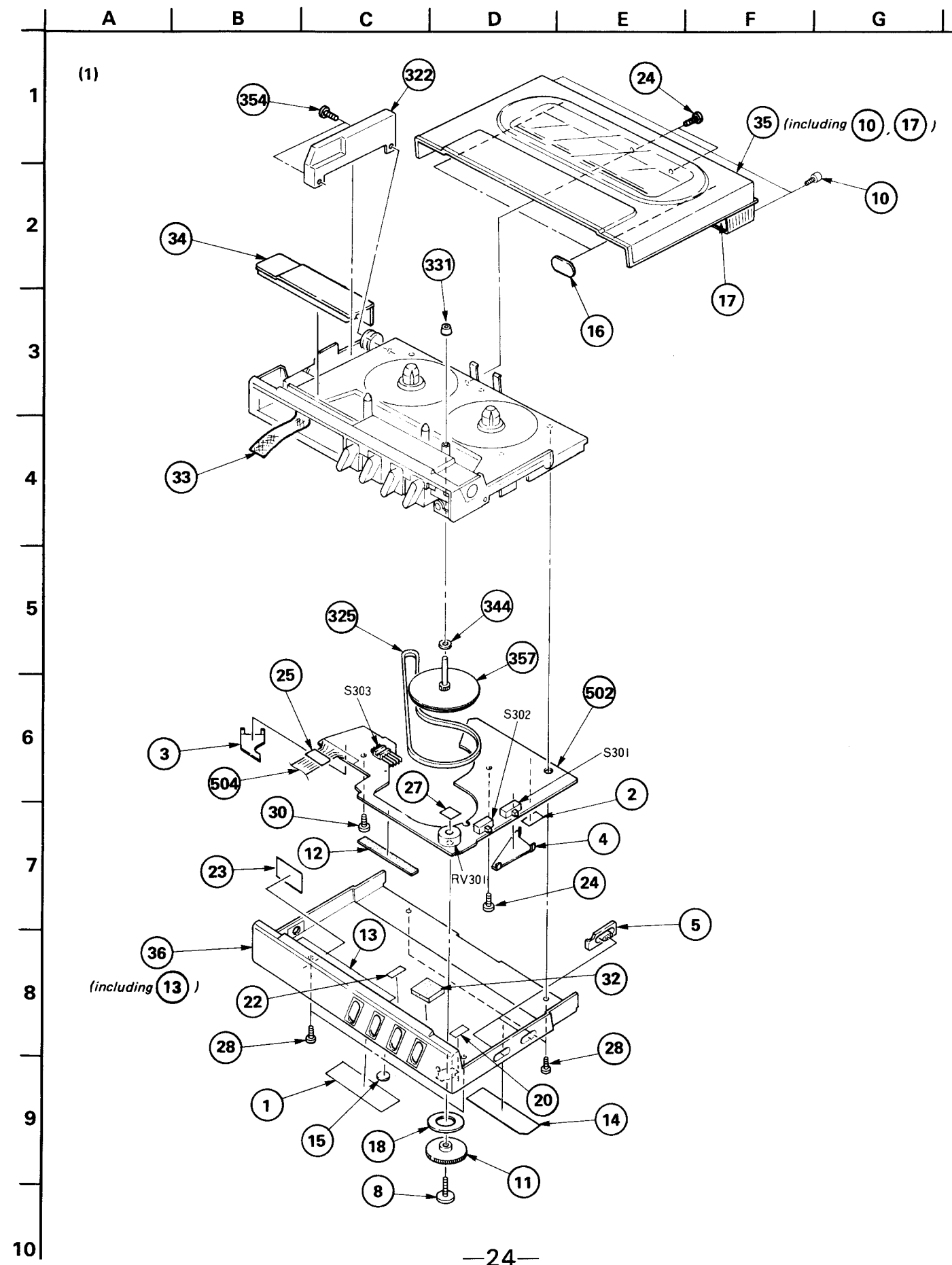
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

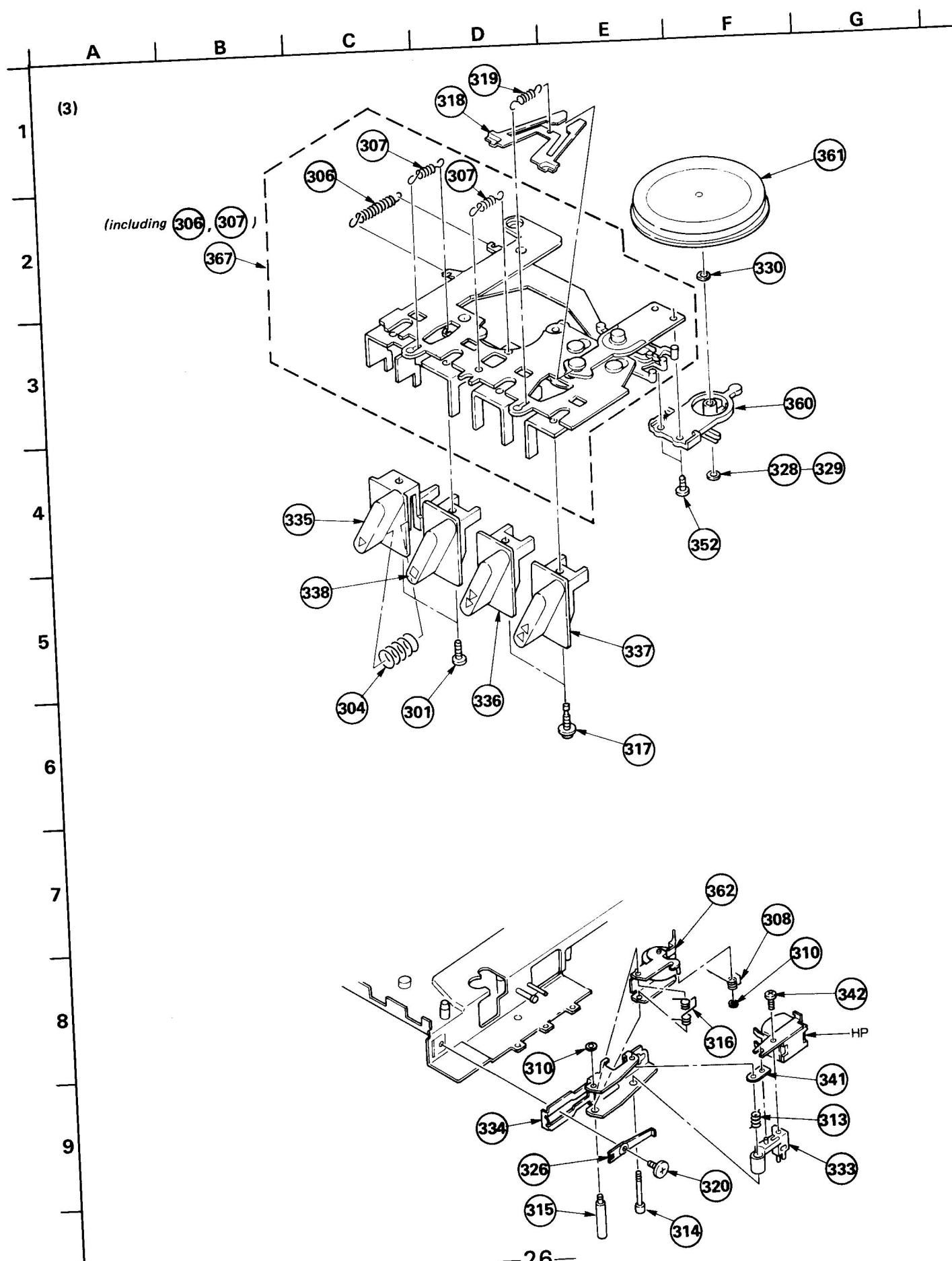


	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W			
301			302									601			801	D			
	302	IC303	301		401			608	610 613 609	606 611 614	604 IC601	612 602 607	603 615	605 617 616	601 602 607	801 802 804	805 803	Q · IC	1



SECTION 5 EXPLODED VIEWS AND PARTS LIST





GENERAL SECTION

No.	Part No.	Description
1	3-305-947-00	LABEL, DOLBY
1	3-305-947-11	LABEL, DOLBY (FOR BLACK)
2	3-312-754-00	SHEET (A), INSULATING
3	3-315-302-00	TERMINAL BOARD (C), GROUND
4	3-315-303-00	TERMINAL BOARD (B), GROUND
5	3-315-305-00	KNOB, SWITCH
6	3-315-306-00	TERMINAL (A), BATTERY
7	3-315-307-00	TERMINAL (B), BATTERY
8	3-315-308-00	SCREW, CONTROL
9	3-315-310-00	RETAINER, JACK
10	3-315-318-00	SCREW, ORNAMENTAL
11	3-315-322-00	KNOB, CONTROL
12	3-315-441-00	SHEET (A)
13	3-315-442-00	LABEL, POLARITY
14	3-315-455-01	LABEL, MODEL NUMBER (FOR BLACK)
14	3-315-455-11	LABEL, MODEL NUMBER
15	3-315-457-01	ORNAMENT, ADJUSTMENT HOLE
15	3-315-457-11	ORNAMENT, ADJUSTMENT HOLE (FOR BLACK)
16	3-315-465-00	CUSHION, CASSETTE
17	3-315-466-00	SHEET, PANEL
18	3-315-467-00	WASHER, CONTROL
19		
20	3-553-566-00	CUSHION
21	3-560-308-00	SHEET (B), INSULATING
22	3-570-611-00	SHEET, PROTECTION, LID
23	3-701-999-00	LABEL, SERIAL NUMBER
24	3-703-816-01	SCREW (M1.4)
24	3-703-816-02	SCREW (M1.4) (FOR BLACK)
25	3-831-441-XX	SPACER
26	3-831-441-XX	SPACER, 3X10
27	3-831-441-XX	CUSHION
28	7-627-551-17	SCREW, PRECISION +P 1.4X2
28	7-627-551-18	SCREW, PRECISION +P 1.4X2 (FOR BLACK)
29	7-627-551-47	SCREW, PRECISION +P 1.4X1.4
30	7-627-850-07	SCREW, PRECISION +P 1.4X2
31	7-627-850-37	SCREW, PRECISION +P 1.4X1.4
32	9-911-815-01	CUSHION
33	9-911-816-01	CLOTH, BATTERY DRAWING
34	X-3315-301-0	LID ASSY, BATTERY CASE
35	X-3315-302-0	PANEL ASSY, CASSETTE (FOR SILVER)
35	X-3315-319-0	PANEL ASSY, CASSETTE (FOR BLACK)
35	X-3315-320-0	PANEL ASSY, CASSETTE (FOR BLUE)
35	X-3315-321-0	PANEL ASSY, CASSETTE (FOR RED)
35	X-3315-323-0	PANEL ASSY, CASSETTE (FOR GOLD)
36	X-3315-339-1	PANEL ASSY, CONTROL (FOR GOLD)
36	X-3315-326-1	PANEL ASSY, CONTROL (FOR SILVER)
36	X-3315-327-1	PANEL ASSY, CONTROL (FOR BLACK)
36	X-3315-328-1	PANEL ASSY, CONTROL (FOR BLUE)
36	X-3315-329-1	PANEL ASSY, CONTROL (FOR RED)

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RESISTORS

- All resistors are in ohms.
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COILS

MMH: mH, UH: μH

SEMICONDUCTORS

In each case, U: μ, for example:
 UA....: μA...., UPA....: μPA...., UPC....: μPC,
 UPD....: μPD....

ACCESSORY & PACKING MATERIAL

No.	Part No.	Description
51	1-528-027-00	BATTERY, NEW SUPER (SUM-3)
52	3-315-444-00	CUSHION
53	3-315-446-00	INDIVIDUAL CARTON
54	3-315-450-00	BELT, CARRYING
55	3-315-949-01	COVER, WINDOW
56	3-701-308-00	LABEL, PRODUCT COLOR (FOR BLACK)
56	3-701-311-00	LABEL, PRODUCT COLOR (FOR RED)
56	3-701-314-00	LABEL, PRODUCT COLOR (FOR BLUE)
56	3-703-729-00	LABEL (SMALL), COLOR (FOR SILVER)
56	3-703-730-00	LABEL (SMALL), COLOR (FOR GOLD)
57	3-701-621-00	BAG, POLYETHYLENE (FOR CARRYING CASE)
58		
59	3-703-710-01	STICKER, SONY SYMBOL (12)
60	3-773-511-11	(AEP,UK)...MANUAL, INSTRUCTION
60	3-773-511-41	(E).....MANUAL, INSTRUCTION
61	3-795-723-01	CARD, ILLUSTRATION
62	3-795-751-01	INSTRUCTION
63	8-951-187-90	HEADPHONE (MDR-W30L)
64	X-3315-336-0	CASE ASSY, CARRYING
65	X-3315-337-0	SLEEVE & STOPPER ASSY

MECHANISM SECTION

No.	Part No.	Description
301	3-305-528-11	SCREW, STOPPER
302	3-315-301-00	TERMINAL BOARD, MOTOR
303	3-315-304-00	TERMINAL BOARD (A), GROUND
304	3-315-331-00	SPRING, COMPRESSION
305	3-315-332-01	SPACER (t=0.05)
305	3-315-332-11	SPACER (t=0.1)
306	3-315-341-00	SPRING, TENSION
307	3-315-343-00	SPRING, TENSION
308	3-315-357-00	SPRING
309	3-315-384-01	WASHER, STOPPER (t=0.13)
310	3-315-384-11	WASHER, STOPPER (t=0.25)
311		
312	3-315-390-00	PLATE, HYSTERESIS
313	3-315-391-00	SPRING
314	3-315-392-00	SCREW, ADJUSTMENT
315	3-315-393-00	SHAFT, PINCH LEVER
316	3-315-394-00	SPRING
317	3-315-395-00	SCREW, BUTTON
318	3-315-396-00	LEVER (C), F.R
319	3-315-397-00	SPRING, TENSION
320	3-315-398-00	SCREW, LOCK
321	3-315-399-00	COLLAR, BUTTON

MECHANISM SECTION

No.	Part No.	Description
322	3-315-402-00	COVER, CONVERTER
323	3-315-403-00	SHAFT (C), STOPPER, CABINET
324	3-315-404-00	SCREW
325	3-315-405-00	BELT
326	3-315-406-00	SPRING
327	3-315-412-00	CONTACT, OUTSERT
328	3-315-414-00	WASHER (t=0.25)
329	3-315-414-11	WASHER (t=0.188)
330	3-315-415-00	WASHER (t=0.075)
331	3-315-417-00	BUSHING, CAPSTAN
332	3-315-419-00	PLATE, SHIELD
333	3-315-430-00	TABLE, HEAD
334	3-315-431-00	CHASSIS, HEAD
335	3-315-432-00	BUTTON, PLAY
336	3-315-433-00	BUTTON, FF
337	3-315-434-00	BUTTON, REW
338	3-315-435-00	BUTTON, STOP
339	3-315-436-00	GEAR (OUTSERT), SUPPLY REEL
340	3-315-437-00	ORNAMENT, REEL
341	3-315-463-00	PLATE, GROUND, HEAD
342	3-315-484-02	SCREW (M2X3), HEAD, WASHER
343	3-315-485-01	SCREW (M1.4X2.3), PRECISION
344	3-315-495-31	WASHER, 2 (t=0.3)
345	3-701-438-01	WASHER (t=0.13)
345	3-701-438-11	WASHER, 2.5 (t=0.25)
346	3-317-702-01	WASHER, 5 (t=0.2)
347	3-703-502-01	SCREW
348	3-831-441-XX	CUSHION, CABINET UPPER 10X7X0.3
349		
350	7-627-451-87	SCREW, PRECISION +K 1.4X2.2
351	7-627-455-07	SCREW, PRECISION +K 1.4X1.4
352	7-627-551-47	SCREW, PRECISION +P 1.4X1.4
353	7-627-850-07	SCREW, PRECISION +P 1.4X2
354	7-627-850-37	SCREW, PRECISION +P 1.4X1.4
355	A-3125-003-A	CHASSIS BLOCK ASSY, REEL
356	A-3133-182-A	WHEEL BLOCK ASSY, MOTOR
357	X-3315-303-0	FLYWHEEL ASSY
358	X-3315-305-0	SLEEVE ASSY, MOTOR
359	X-3315-306-0	BRACKET ASSY, REAR PANEL
360	X-3315-307-0	LEVER (B) ASSY, FR
361	X-3315-308-0	WHEEL ASSY, REVERSE
362	X-3315-311-0	PINCH LEVER ASSY
363	X-3315-312-0	CHASSIS ASSY, MOTOR
364	X-3315-314-0	CHASSIS ASSY, TAKE-UP REEL
365	X-3315-315-0	GEAR ASSY, TAKE-UP REEL
366	X-3315-316-0	SLEEVE (COMP) ASSY
367	X-3315-317-0	PLATE ASSY, CONTROL

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ELECTRICAL PARTS

Ref.No.	Part No.	Description		
501	▲;1-610-702-00	PC BOARD, CONVERTER		
502	▲;A-3015-198-A	MOUNTED PCB, AUDIO		
503	A-3065-035-A	SERVO UNIT		
504	A-3089-055-A	PC BOARD ASSY, FLEXIBLE		
C101	1-163-008-00	CERAMIC CHIP 820PF	10%	50V
C102	1-163-016-00	CERAMIC CHIP 0.0039MF	10%	50V
C103	1-135-104-00	TANTAL. CHIP 10MF	10%	4V
C104	1-135-103-00	TANTAL. CHIP 3.3MF	20%	4V
C105	1-163-021-00	CERAMIC CHIP 0.01MF	5%	50V
C106	1-163-021-00	CERAMIC CHIP 0.01MF	5%	50V
C107	1-135-073-00	TANTAL. CHIP 0.33MF	10%	35V
C108	1-135-073-00	TANTAL. CHIP 0.33MF	10%	35V
C109	1-135-070-00	TANTAL. CHIP 0.1MF	10%	35V
C110	1-135-091-00	TANTAL. CHIP 1MF	20%	16V
C111	1-163-013-00	CERAMIC CHIP 0.0022MF	10%	50V
C112	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C113	1-135-091-00	TANTAL. CHIP 1MF	20%	16V
C201	1-163-008-00	CERAMIC CHIP 820PF	10%	50V
C202	1-163-016-00	CERAMIC CHIP 0.0039MF	10%	50V
C203	1-135-104-00	TANTAL. CHIP 10MF	10%	4V
C204	1-135-103-00	TANTAL. CHIP 3.3MF	20%	4V
C205	1-163-021-00	CERAMIC CHIP 0.01MF	5%	50V
C206	1-163-021-00	CERAMIC CHIP 0.01MF	5%	50V
C207	1-135-073-00	TANTAL. CHIP 0.33MF	10%	35V
C208	1-135-073-00	TANTAL. CHIP 0.33MF	10%	35V
C209	1-135-070-00	TANTAL. CHIP 0.1MF	10%	35V
C210	1-135-091-00	TANTAL. CHIP 1MF	20%	16V
C211	1-163-013-00	CERAMIC CHIP 0.0022MF	10%	50V
C212	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C213	1-135-091-00	TANTAL. CHIP 1MF	20%	16V
C303	1-135-105-00	TANTAL. CHIP 33MF	20%	4V
C304	1-124-413-00	ELECT 220MF	20%	4V
C305	1-135-104-00	TANTAL. CHIP 10MF	10%	4V
C306	1-135-095-00	TANTAL. CHIP 1.5MF	20%	10V
C401	1-124-413-00	ELECT 220MF	20%	4V
C402	1-124-413-00	ELECT 220MF	20%	4V
C403	1-163-009-00	CERAMIC CHIP 0.001MF	10%	50V
C404	1-163-009-00	CERAMIC CHIP 0.001MF	10%	50V
C405	1-163-009-00	CERAMIC CHIP 0.001MF	10%	50V
C406	1-163-009-00	CERAMIC CHIP 0.001MF	10%	50V
C407	1-163-009-00	CERAMIC CHIP 0.001MF	10%	50V
C601	1-163-986-00	CERAMIC CHIP 0.027MF	10%	25V
C602	1-163-986-00	CERAMIC CHIP 0.027MF	10%	25V
C603	1-135-091-00	TANTAL. CHIP 1MF	20%	16V
C604	1-135-104-00	TANTAL. CHIP 10MF	20%	4V
C605	1-163-038-00	CERAMIC CHIP 0.1MF		25V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C606	1-135-073-00	TANTAL. CHIP 0.33MF	10%	35V	
C607	1-135-091-00	TANTAL. CHIP 1MF	20%	16V	
C608	1-135-070-00	TANTAL. CHIP 0.1MF	10%	35V	
C609	1-124-413-00	ELECT 220MF	20%	4V	
C610	1-135-103-00	TANTAL. CHIP 3.3MF	20%	4V	
C611	1-135-103-00	TANTAL. CHIP 3.3MF	20%	4V	
C612	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C801	1-163-017-00	CERAMIC CHIP 0.0047MF	10%	50V	
C802	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C803	1-135-104-00	TANTAL. CHIP 10MF	20%	4V	
C804	1-135-103-00	TANTAL. CHIP 3.3MF	20%	4V	
C805	1-124-413-00	ELECT 220MF	20%	4V	
CNJ401	1-507-894-00	JACK, EXTERNAL POWER			
D301	8-719-100-03	DIODE 1S2835			
D302	8-719-908-30	DIODE DA106K			
D401	8-719-908-40	DIODE GL-2PR7			
D601	8-719-908-30	DIODE DA106K			
D801	8-719-105-65	DIODE RD4.3M-B3			
HP	8-825-507-10	HEAD (PP227-3602H)			
IC301	8-759-910-18	IC BA3304F			
IC302	8-759-908-08	IC CX20085			
IC303	8-759-600-67	IC CX20089			
IC601	8-759-700-75	IC NJM2901MB			
J401	1-507-895-00	JACK, HEADPHONE (WITH SW)			
JR301	1-216-295-00	METAL CHIP 0	5%	1/10W	
JR302	1-216-295-00	METAL CHIP 0	5%	1/10W	
JR303	1-216-296-00	METAL CHIP 0	5%	1/8W	
JR304	1-216-296-00	METAL CHIP 0	5%	1/8W	
JR305	1-216-296-00	METAL CHIP 0	5%	1/8W	
JR306	1-216-296-00	METAL CHIP 0	5%	1/8W	
JR307	1-216-296-00	METAL CHIP 0	5%	1/8W	
JR308	1-216-296-00	METAL CHIP 0	5%	1/8W	
JR309	1-216-296-00	METAL CHIP 0	5%	1/8W	
JR310	1-216-295-00	METAL CHIP 0	5%	1/10W	
JR801	1-216-295-00	METAL CHIP 0	5%	1/10W	
L1-6	1-462-209-00	COIL, MOTOR (STATOR)			
L801	1-408-946-00	INDUCTOR CHIP 56UH			
Q301	8-729-100-66	TRANSISTOR 2SC1623			
Q302	8-729-216-22	TRANSISTOR 2SA1162			
Q401	8-729-216-22	TRANSISTOR 2SA1162			
Q601	8-729-216-22	TRANSISTOR 2SA1162			
Q602	8-729-100-66	TRANSISTOR 2SC1623			
Q603	8-729-900-51	TRANSISTOR DTA114TK			

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ELECTRICAL PARTS

Ref.No.	Part No.	Description			
Q604	8-729-100-66	TRANSISTOR 2SC1623			
Q605	8-729-100-66	TRANSISTOR 2SC1623			
Q606	8-729-900-52	TRANSISTOR DTC114YK			
Q607	8-729-100-66	TRANSISTOR 2SC1623			
Q608	8-729-102-44	TRANSISTOR 2SB624			
Q609	8-729-100-66	TRANSISTOR 2SC1623			
Q610	8-729-216-22	TRANSISTOR 2SA1162			
Q611	8-729-216-22	TRANSISTOR 2SA1162			
Q612	8-729-100-66	TRANSISTOR 2SC1623			
Q613	8-729-102-62	TRANSISTOR 2SC1623			
Q614	8-729-102-44	TRANSISTOR 2SB624			
Q615	8-729-100-66	TRANSISTOR 2SC1623			
Q616	8-729-100-66	TRANSISTOR 2SC1623			
Q617	8-729-100-66	TRANSISTOR 2SC1623			
Q801	8-729-102-44	TRANSISTOR 2SB624			
Q802	8-729-100-66	TRANSISTOR 2SC1623			
Q803	8-729-159-64	TRANSISTOR 2SD596			
Q804	8-729-102-44	TRANSISTOR 2SB624			
Q805	8-729-100-66	TRANSISTOR 2SC1623			
R101	1-216-089-00	METAL CHIP 47K	5%	1/10W	
R102	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R103	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R104	1-216-118-00	METAL CHIP 750K	5%	1/10W	
R105	1-216-047-00	METAL CHIP 820	5%	1/10W	
R106	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R107	1-216-052-00	METAL CHIP 1.3K	5%	1/10W	
R108	1-216-106-00	METAL CHIP 240K	5%	1/10W	
R109	1-216-070-00	METAL CHIP 7.5K	5%	1/10W	
R111	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R201	1-216-089-00	METAL CHIP 47K	5%	1/10W	
R202	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R203	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R204	1-216-118-00	METAL CHIP 750K	5%	1/10W	
R205	1-216-047-00	METAL CHIP 820	5%	1/10W	
R206	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R207	1-216-052-00	METAL CHIP 1.3K	5%	1/10W	
R208	1-216-106-00	METAL CHIP 240K	5%	1/10W	
R209	1-216-070-00	METAL CHIP 7.5K	5%	1/10W	
R211	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R302	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R303	1-216-047-00	METAL CHIP 820	5%	1/10W	
R304	1-216-113-00	METAL CHIP 470K	5%	1/10W	
R305	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R307	1-216-254-00	METAL CHIP 220K	5%	1/8W	
R308	1-216-118-00	METAL CHIP 750K	5%	1/10W	
R401	1-216-065-00	METAL CHIP 4.7K	5%	1/10W	

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R402	1-216-058-00	METAL CHIP 2.4K	5%	1/10W	
R403	1-216-025-00	METAL CHIP 100	5%	1/10W	
R601	1-216-090-00	METAL CHIP 51K	5%	1/10W	
R602	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R603	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R604	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R605	1-216-092-00	METAL CHIP 62K	5%	1/10W	
R606	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R607	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R608	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R609	1-216-047-00	METAL CHIP 820	5%	1/10W	
R610	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R611	1-216-092-00	METAL CHIP 62K	5%	1/10W	
R612	1-216-118-00	METAL CHIP 750K	5%	1/10W	
R613	1-216-093-00	METAL CHIP 68K	5%	1/10W	
R614	1-216-083-00	METAL CHIP 27K	5%	1/10W	
R615	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R616	1-216-103-00	METAL CHIP 180K	5%	1/10W	
R617	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R618	1-216-091-00	METAL CHIP 56K	5%	1/10W	
R619	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R620	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R621	1-216-047-00	METAL CHIP 820	5%	1/10W	
R622	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R623	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R624	1-216-001-00	METAL CHIP 10	5%	1/10W	
R625	1-216-094-00	METAL CHIP 75K	5%	1/10W	
R626	1-216-107-00	METAL CHIP 270K	5%	1/10W	
R627	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R628	1-216-052-00	METAL CHIP 1.3K	5%	1/10W	
R629	1-216-107-00	METAL CHIP 270K	5%	1/10W	
R630	1-216-094-00	METAL CHIP 75K	5%	1/10W	
R631	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R632	1-216-001-00	METAL CHIP 10	5%	1/10W	
R633	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R634	1-216-065-00	METAL CHIP 4.7K	5%	1/10W	
R635	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R636	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R637	1-216-113-00	METAL CHIP 470K	5%	1/10W	
R638	1-216-094-00	METAL CHIP 75K	5%	1/10W	
R639	1-216-053-00	METAL CHIP 1.5K	5%	1/10W	
R640	1-216-079-00	RES, CHIP 18K			
R801	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R802	1-216-113-00	METAL CHIP 470K	5%	1/10W	
R803	1-216-035-00	METAL CHIP 270	5%	1/10W	

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R804	1-216-007-00	METAL CHIP 18	5%	1/10W	
R805	1-216-113-00	METAL CHIP 470K	5%	1/10W	
RV101	1-230-181-00	RES, ADJ, METAL GLAZE 2.2K			
RV201	1-230-181-00	RES, ADJ, METAL GLAZE 2.2K			
RV301	1-230-180-00	RES, VAR, CARBON 10K/10K (VOLUME)			
RV601	1-230-182-00	RES, ADJ, METAL GLAZE 100K			
S301	1-554-585-00	SWITCH, SLIDE (M-N)			
S302	1-554-584-00	SWITCH, SLIDE (DOLBY)			
S303	1-554-586-00	SWITCH, LEAF			
T801	1-447-666-00	TRANSFORMER, DC-DC CONVERTER			
TH601	1-806-715-11	THERMISTOR			